

Supplementary Material for “Organ-Aware
Routing Mixture-of-Retrieval Augmented
Generation for Fetal Ultrasound Reporting”

Appendix

A Examples of Report Generation

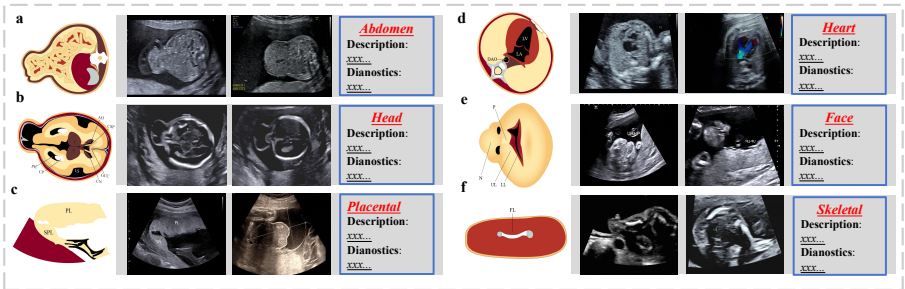


Figure A1: Example of 6 types of diseases detected by prenatal ultrasound.








Ultrasound Image	BiomedCLIP	Ours	G T
	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the outline of the brain content, and no significant expansion of the lateral ventricles. The transparent component is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the outline of the brain content, and no significant expansion of the lateral ventricles. The transparent component is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the outline of the brain content, and no significant expansion of the lateral ventricles. The transparent component is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>
	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>
	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The left and right atria, as well as the left and right ventricles, are generally symmetrical in size, with consistent connections between the atria and ventricles. There is a cross-shaped cross in the center of the heart, with clear left and right atrioventricular valves and visible opening and closing movements on both sides. Dilated coronary sinus can be seen at the atrioventricular groove, and the dilated coronary sinus merges into the right atrium. Left and right ventricular outflow tract sections. The pulmonary artery is clear, and the aorta and pulmonary artery can be displayed. There is no significant abnormality in the heart. The connection between the ventricle and the pulmonary artery. Three vessel tracheal section. A valvular section of a blood vessel can be seen on the left side of the pulmonary artery, and a slightly tilted probe towards the head can reveal the left unpaired vein. By rotating the probe 90°, the longitudinal section of the vessel can be displayed. Tracking and searching along the direction of the modified vessel, it can be seen that it merges into the dilated coronary sinus. The right superior vena cava can be displayed on the right side of the aortic arch. Color Doppler: There is no obvious regurgitation in the left and right atrioventricular valves, no shunt at the ventricular level, and the blood flow in the left superior vena cava on the three vessel tracheal section is consistent. The blood flow in the left superior vena cava merges into the right atrium through the dilated coronary sinus. Can display a pulmonary vein entering the left atrium. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>
	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines: visible in the liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines: visible in the liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines: visible in the liver, gallbladder, stomach, and intestines.</p>
	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms, and hands in a fist shape. Visible on both thighs and knees, visible on both calves and shins and fibula, visible on both feet.</p>	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms, and hands in a fist shape. Bilateral thighs and their femurs are visible, bilateral calves and their shins and fibulae are visible, both feet are visible, both feet are in an inverted position, and this position remains unchanged when the limbs move 2-3 times.</p>	<p>Fetal limbs: Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Bilateral thighs and their femurs are visible, bilateral calves and their shins and fibulae are visible, both feet are visible, both calves and shins are visible on all surfaces, both feet are in an inverted position, and this position remains unchanged when the limbs move 2-3 times.</p>
	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is of grade 0.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is of grade 0.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is of grade 0.</p>
	<p>Examination prompt: Intrauterine pregnancy, single live birth, breech presentation, placenta grade 0. The size of the fetus is equivalent to 25 weeks and 1 day. The fetus shows changes in both feet, including inversion of both feet. Suggest visiting a prenatal diagnosis clinic. Cautious, In the presence of a prenatal diagnosis clinic. Cautious, In the presence of a prenatal diagnosis clinic. Cautious, In the presence of a prenatal diagnosis clinic.</p>	<p>Examination prompt: Intrauterine pregnancy, single live birth, head position, placenta grade 0. The size of the fetus is equivalent to 25 weeks and 1 day. The fetus shows changes in both feet, including inversion of both feet. Suggest visiting a prenatal diagnosis clinic. Abnormal limbs.</p>	<p>Examination prompt: Intrauterine pregnancy, single live birth, breech presentation, placenta grade 0. The size of the fetus is equivalent to 25 weeks and 1 day. The fetus shows changes in both feet, including inversion of both feet. Suggest visiting a prenatal diagnosis clinic. Abnormal limbs.</p>

Figure A2: Example of limbs abnormality of report generation.





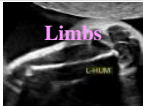


Ultrasound Image	BiomedCLIP	Ours	G T
	<p>Fetal head: The skull presents an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent compartment is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull presents an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent compartment is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull presents an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent compartment is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>
	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>
	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The cross valve of the interventricular septum is visible, and a cross shaped cross exists in the center of the heart. The left and right anteroventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are generally symmetrical in size, with consistent connections between the atria and ventricles. There is a cross shaped cross in the center of the heart, with clear left and right anteroventricular valves and visible opening and closing movements on both sides. Dilated coronary sinus can be seen at the anteroventricular groove, and the dilated coronary sinus merges into the right atrium. Left and right ventricular outflow tract sections. The aorta and pulmonary artery can be displayed, arranged in a cross pattern in the heart, with no significant abnormalities in diameter. The connection between the ventricle and the aorta is consistent. Three vessel tracheal section: A transverse section of a blood vessel can be seen on the left side of the pulmonary artery, and a slightly tilted probe towards the head can reveal the left unpaired vein. By rotating the probe 90°, the longitudinal section of the vessel can be displayed. Tracking and searching along the direction of the modified vessel, it can be seen that it merges into the dilated coronary sinus. The right superior vena cava can be displayed on the right side of the aorta, such. Color Doppler: There is no obvious regurgitation of the left and right anteroventricular valves, no obvious ventricular level, and the blood flow in the left superior vena cava on the three vessel tracheal section is consistent. The blood flow in the left superior vena cava merges into the right atrium through the dilated coronary sinus. Can display pulmonary veins entering the left atrium. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The cross valve of the interventricular septum is visible, and a cross shaped cross exists in the center of the heart. The left and right anteroventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Three vessel tracheal section: A transverse section of a blood vessel can be seen on the left side of the pulmonary artery, and the probe is slightly tilted towards the head side without the left unpaired vein. By rotating the probe 90°, the longitudinal section of the vessel can be displayed. Tracking and searching along the direction of the modified vessel, it can be seen that it merges into the dilated coronary sinus. The right superior vena cava can be displayed on the right side of the aorta, such. Fetal lungs: Both lungs are visible, with uniform echoes.</p>
	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines are visible in the liver.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines are visible in the liver.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines are visible in the liver.</p>
	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible upper thighs and femurs, visible on both calves and fibula and tibia on both feet.</p>	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and fibula and tibia on both feet.</p>	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and fibula and tibia, visible on both feet.</p>
	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is classified as Grade I. The edge of the placenta is circular, and thickened areas can be seen connecting the upper and lower edges to the uterus. The internal echoes are consistent with the echotexture of the placenta.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the anterior wall of the uterus and is of grade I.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the anterior wall of the uterus and is of grade I.</p>
	<p>Examination prompt: Examination indicates premature pregnancy, singleton live birth, placenta grade I. The size of the fetus is equivalent to 20 weeks and 1 day. Changes in placental ultrasound suggest the presence of a divided placenta. Abnormal placenta.</p>	<p>Examination prompt: Examination indicates premature pregnancy, singleton live birth, placenta grade I. The size of the fetus is equivalent to 20 weeks and 1 day. The fetal cardiac ultrasound changes are consistent with persistent left superior vena cava (persistent left superior vena cava). Suggest visiting the prenatal diagnosis clinic and undergoing follow-up examinations. Cardiac abnormalities.</p>	<p>Examination prompt: Examination indicates premature pregnancy, singleton live birth, and placental grade I. The size of the fetus is equivalent to 20 weeks and 1 day. The fetal cardiac ultrasound changes are consistent with persistent left superior vena cava (persistent left superior vena cava). Suggest visiting the prenatal diagnosis clinic and undergoing follow-up examinations. Cardiac abnormalities.</p>

Figure A3: Example of limbs abnormality of report generation.






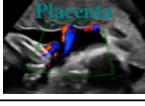

Ultrasound Image	BiomedCLIP	Ours	G T
	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent component is visible. The Rhinurus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent component is visible. The Rhinurus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent component is visible. The Rhinurus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>
	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>
	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>
	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the site of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines are visible in the liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the site of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines are visible in the liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the site of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines are visible in the liver, gallbladder, stomach, and intestines.</p>
	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both feet, both femurs, visible on both calves and thighs and fibula, visible on both feet.</p>	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both feet, both femurs, visible on both calves and thighs and fibula, visible on both feet.</p>	<p>Fetal limbs: Visible upper arms and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and thighs and fibula, visible on both feet.</p>
	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is of grade 0. The placenta is circular, and thick and strong echoes can be seen connecting the upper and lower edges of the placenta. The umbilical cord is consistent with the echoes of the placental tissue.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is of grade 0. A liquid dark area can be seen under the placental chorionic plate, with a range of about 6.0 × 1.8cm, and dotted echo fibrous tissue can be seen inside.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the anterior wall of the uterus and is of grade 0. A liquid dark area can be seen at the lower edge of the placenta, with a range of about 8.3 × 1.8cm.</p>
	<p>Examination prompt: Inmaternity pregnancy, singleton live birth, placenta grade 0. The size of the fetus is equivalent to 24 weeks and 1 day. Changes in placental ultrasound suggest the presence of placental abnormalities. Abnormal placenta.</p>	<p>Examination prompt: Inmaternity pregnancy, single live birth, head position, placenta grade 0. The size of the fetus is equivalent to 24 weeks and 3 days. Changes in placental ultrasound, considering placental abnormalities. Abnormal placenta.</p>	<p>Examination prompt: Inmaternity pregnancy, singleton live birth, placenta grade 0. The size of the fetus is equivalent to 24 weeks and 1 day. Changes in placental ultrasound, possibly involving blood stasis. Abnormal placenta.</p>

Figure A4: Example of placenta abnormality of report generation.




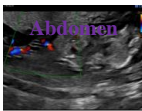



Ultrasound Image	BiomedCLIP	Ours	G T
	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent component is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent component is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent component is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>
	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>
	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The left and right atria, as well as the left and right ventricles, are generally symmetrical in size, with consistent connections between the atria and ventricles. There is a cross-shaped cross in the center of the heart, with clear left and right atrioventricular valves and visible opening and closing movements of the valves. Dilated coronary sinus can be seen at the atrioventricular junction. The pulmonary artery can be displayed, arranged in a cross pattern in the heart, with no significant abnormalities in diameter. The connection between the ventricle and the aorta is consistent. Three vessel tracheal section: A transverse section of a blood vessel can be seen on the left side of the pulmonary artery, and a slightly tilted probe towards the head can reveal the left unnamed vein. By rotating the probe 90°, the longitudinal section of the vessel can be displayed. Tracking and searching along the direction of the modified vessel, it can be seen that it merges into the dilated coronary sinus. The right superior vena cava can be displayed on the right side of the aortic arch. Color Doppler: There is no obvious regurgitation in the left and right atrioventricular valves, no shut at the ventricular level, and the blood flow in the left superior vena cava on the three vessel tracheal section is centrifugal. The blood flow in the left superior vena cava merges into the right atrium through the dilated coronary sinus. Can display a pulmonary vein entering the left atrium. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four-chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interatrial septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the pulmonary artery and pulmonary trunk is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four-chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interatrial septum is visible, and a cross-shaped cross exists in the center of the heart. The left and right atrioventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the pulmonary artery and pulmonary trunk is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>
	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the root of the placenta and fetal liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: The continuous echo of the fetal abdominal wall is interrupted, and the defect range is small, about 2.5cm. The internal organs protrude from the defect to form a mass, with a size of about 4.7 x 3.7cm. The contents of the bulging mass are intestinal tubes, and a membrane-like substance can be seen wrapping around the surface of the bulging mass. There is no obvious abdominal wall insertion site abnormality, located on the right side of the mass.</p>	<p>Fetal abdominal wall: The continuous echo of the fetal abdominal wall is interrupted, and the defect area is small. The internal organs protrude from the defect to form a small lump, with a size of about 3.9 x 1.3cm. The contents of the bulging lump are intestinal tubes, and a membrane-like substance can be seen wrapping around the surface of the lump. There is no cyst echo on the surface of the lump. The position of the umbilical cord abdominal wall insertion is abnormal, located on the left side of the lump. Local intestinal widening of about 1.7cm can be seen on the abdominal side of the umbilical foramen, which appears to be connected to the bulging intestinal tract. Fetal liver, gallbladder, stomach, and intestines are visible in the liver.</p>
	<p>Fetal limbs: Visible upper arms and humeri on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and tibiae and fibulae, visible on both feet.</p>	<p>Fetal limbs: Visible upper arms and humeri on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and tibiae and fibulae, visible on both feet.</p>	<p>Fetal limbs: Visible upper arms and humeri on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and tibiae and fibulae, visible on both feet.</p>
	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta is attached to the anterior wall of the uterus and is of grade 0.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta is attached to the anterior wall of the uterus and is of grade 0.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the anterior wall of the uterus and is of grade 0.</p>
	<p>Examination prompt: Intrauterine pregnancy, single live birth, head position, placenta grade 0. The size of the fetus is equivalent to 23 weeks and 5 days. Fetal cranial abnormality changes are consistent with previous MRI examination. Bilateral superior vena cava (bilateral superior vena cava). Cranial abnormalities.</p>	<p>Examination prompt: Intrauterine pregnancy, singleton live birth, placenta grade 0. The size of the fetus is equivalent to 28 weeks and 5 days. Fetal cranial abnormality changes indicate the absence of a top body. Suggest visiting a prenatal diagnosis clinic and undergoing MRI examination.</p>	<p>Examination prompt: Intrauterine pregnancy, single live birth, head position, placenta grade 0. The size of the fetus is equivalent to 28 weeks and 5 days. Fetal cranial abnormality changes indicate the absence of a top body. Suggest visiting the prenatal diagnosis clinic and undergoing MRI examination. Abnormal brain function.</p>

Figure A5: Example of abdomen abnormality of report generation.

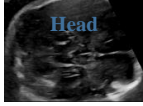






Ultrasound Image	BiomedCLIP	Ours	G T
	<p>Fetal head: The skull presents an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent compartment is visible. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa.</p>	<p>Fetal head: The skull appears as an elliptical hyperechoic ring, with symmetrical cerebral hemispheres on both sides, the midline of the brain centered, and no significant expansion of the lateral ventricles. The transparent compartment disappears. The thalamus is visible, symmetrical on both sides, and the third ventricle is elevated. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa. On the mid sagittal section of the skull, the body completely disappears, and the cingulate gyrus and its sulcus are not visible. Color Doppler cannot display the posterior cerebral artery.</p>	<p>Fetal head: Fetal head: The skull presents an elliptical hyperechoic ring, with symmetrical hemispheres on both sides of the brain and a central midline. The lateral ventricles are dilated, with a width of 1.2 cm on the right side and a meningeal-like appearance. The midline structure in the transverse section of the skull shows a "three-line sign". The transparent compartment disappears. The thalamus is visible and symmetrical on both sides. On the transverse section of the cerebellum, there are no obvious abnormalities in the morphology of the cerebellar hemisphere, which is symmetrical on both sides. The vermis of the cerebellum can be seen, and there is no significant enlargement of the posterior cranial fossa. On the midline sagittal section of the skull, the body completely disappears, the cingulate gyrus and cingulate sulcus are not visible, color Doppler cannot display the posterior cerebral artery, and the vermis of the cerebellum can be seen.</p>
	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>	<p>Fetal face: The fetal eyeballs can be displayed on both sides, symmetrically, and both nostrils can be displayed. There is no obvious continuous interruption in the echo of the upper lip skin.</p>
	<p>Fetal heart: Four chamber view: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The left and right atria, as well as the left and right ventricles, are generally symmetrical in size, with consistent connections between the atria and ventricles. There is a cross shaped cross in the center of the heart, with clear left and right anteroventricular valves and visible opening and closing movements on both sides. Dilated coronary sinus can be seen at the anteroventricular groove, and the dilated coronary sinus merges into the right atrium. Left and right ventricular outflow tract sections: The aorta and pulmonary artery can be displayed, arranged in a crossed manner in the heart, with no significant abnormalities in diameter. The connection between the ventricle and the aorta is consistent. Three vessel tracheal section: A transverse section of a blood vessel can be seen on the left side of the pulmonary artery, and a slightly tilted probe towards the head can reveal the left internal vein. By rotating the probe 90°, the longitudinal section of the vessel can be displayed. Tracking and searching along the direction of the modified vessel, it can be seen that it merges into the dilated coronary sinus. The right superior vena cava can be displayed on the right side of the trachea. Color Doppler: There is no obvious separation between the left and right anteroventricular valves, and no obvious regurgitation at the ventricular level, and the blood flow in the left superior vena cava is in the three vessel tracheal section is consistent. The right flow in the left superior vena cava merges into the right atrium through the dilated coronary sinus. Can display a pulmonary vein entering the left atrium. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross shaped cross exists in the center of the heart. The left and right anteroventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>	<p>Fetal heart: The apex of the heart points to the left side of the chest cavity, and there is no significant increase in the proportion of the heart to the chest. The four chamber view can clearly show that the left and right atria, as well as the left and right ventricles, are basically symmetrical in size. The oval valve of the interventricular septum is visible, and a cross shaped cross exists in the center of the heart. The left and right anteroventricular valves are clear, and opening and closing movements can be seen on both sides of the valves. No significant abnormalities were observed in the movement of the left and right ventricular walls. The sectional view of the left and right ventricular outflow tract is clear, and the aorta and pulmonary artery can be displayed. The two are arranged in a cross pattern in the heart, and there is no obvious abnormality in the diameter of the tube. Fetal lungs: Both lungs are visible, with uniform echoes.</p>
	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the level of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines: visible in the liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the level of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines: visible in the liver, gallbladder, stomach, and intestines.</p>	<p>Fetal abdominal wall: There is no obvious continuity interruption in the echo of the abdominal wall, and the umbilical cord can be seen inserted into the fetal abdominal wall. There is no obvious mass at the level of the umbilical cord. Fetal liver, gallbladder, stomach, and intestines: visible in the liver, gallbladder, stomach, and intestines.</p>
	<p>Fetal limbs: Visible upper arm and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and tibiae and fibulae, visible on both feet.</p>	<p>Fetal limbs: Visible upper arm and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and tibiae and fibulae, visible on both feet.</p>	<p>Fetal limbs: Visible upper arm and humerus on both sides, visible ulna and radius on both forearms and inside, hands in a fist shape. Visible on both thighs and femurs, visible on both calves and tibiae and fibulae, visible on both feet.</p>
	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: Inhomogeneous, singleton live birth, placenta grade 0.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the posterior wall of the uterus and is of grade 0.</p>	<p>Fetal umbilical cord: 2 umbilical arteries. Placenta: The placenta attaches to the anterior wall of the uterus and is of grade 0.</p>
	<p>Examination prompt: Inhomogeneous pregnancy, singleton live birth, placenta grade 0. The size of the fetus is equivalent to 28 weeks and 4 days. The fetal cardiac ultrasound changes are consistent with a normal fetus. Left superior vena cava (bilateral superior vena cava). Can't see abnormalities.</p>	<p>Examination prompt: Inhomogeneous pregnancy, singleton live birth, placenta grade 0. The size of the fetus is equivalent to 28 weeks and 4 days. The fetal cardiac ultrasound changes indicate the absence of a ring body. Suggest visiting a prenatal diagnosis clinic and undergoing MRI examination.</p>	<p>Examination prompt: Inhomogeneous pregnancy, singleton live birth, placenta grade 0. The size of the fetus is equivalent to 28 weeks and 4 days. Fetal cardiac ultrasound changes indicate the absence of a ring body. Suggest visiting the prenatal diagnosis clinic and undergoing MRI examination.</p>

Figure A6: Example of head abnormality of report generation.

B Detailed Description of Our Dataset

To fulfill the stipulated criteria for the automated generation of fetal multi-organ ultrasound reports, we collect a comprehensive dataset called ***FetusR***. FetusR comprises a total of 11,679 confirmed prenatal cases, totaling 130,394 images, obtained from our partner hospital between January 2014 and March 2024. The cases are obtained from the hospital’s prenatal ultrasound clinic and encompass a broad spectrum of fetal structural abnormalities. Each case includes complete original ultrasound image data and corresponding standardized ultrasound reports. FetusR comprises six categories of fetal abnormalities (Figure A1), namely abdominal abnormalities (AA), cardiac abnormalities (CA), head abnormalities (HA), limb abnormalities (LA), placental abnormalities (PA), and facial abnormalities (FA), along with normal (NM) cases. The respective case numbers for each category are as follows: 277 (AA), 3,668 (CA), 641 (HA), 698 (LA), 2,620 (PA), 987 (FA), and 4,000 (NM).

Ultrasound images were obtained using equipment from Samsung and Sonoscape manufacturers, encompassing the multi-standard sections mandated for standard prenatal screening. All ultrasound reports were prepared by the ISUOG prenatal ultrasound examination standard template to ensure consistency and standardization of report content (Khalil et al. 2024; Salomon et al. 2022). The diagnostic evaluation, image acquisition, and report writing for each case were conducted by the same ultrasound physician with over a decade of prenatal ultrasound experience, ensuring data consistency and professional standards. To ensure the accuracy and reliability of the data, all cases must be confirmed through a meticulous postpartum follow-up review. Furthermore, all case information undergoes rigorous de-identification during collection and organization, ensuring the complete removal of any personal identifying information to safeguard patient privacy. This study has been reviewed and endorsed by the Ethics Committee of our institution, and all subjects have provided written consent for their participation.

C Entire Report of Confidence Example

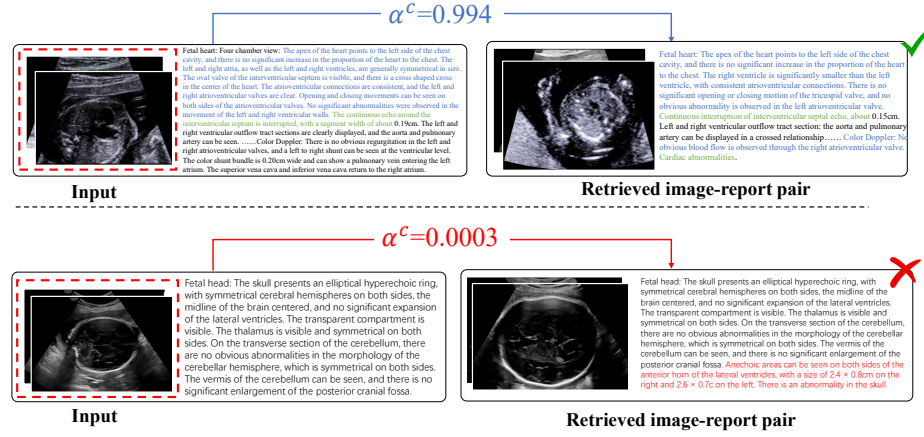


Figure A7: Example of retrieval results

D Hyperparametric Experiments

For the multimodal retriever, we use ViT-Base as the backbone which was pretrained on ImageNet-21K. During training the ViT-Base, we fine-tune only the last two Transformer blocks, freezing all remaining layers. We use the Adam optimizer with a learning rate of 1×10^{-5} , a batch size of 8, and train for 30 epochs. The training loss is a weighted combination of $\mathcal{L}_{\text{organ-con}}$ and $\mathcal{L}_{\text{ab-sup}}$, where the loss weight λ is set to 0.33. We index images in FAISS using 768-dimensional features obtained by mean-pooling patch tokens from the last ViT layer. Dynamic Routing is then applied to retain only confident, informative samples from the retrieved set. Specifically, decaying weights w_i are first computed with $\beta = 0.2$, followed by a smoothed and weighted match probability p_{match} computed under $\gamma = 1 \times 10^{-5}$. Finally, the confidence score α^c is calculated using a sigmoid function with scaling factor $\sigma = 10.0$ and bias term $\delta = 1.0$. For the multimodal foundation model, we use InternVL as the backbone. We apply AdamW optimizer with an initial learning rate of 4×10^{-5} , a weight decay of 0.01, a batch size of 4, and train for 7 epochs. We also set the random seeds explicitly to the corresponding dataset indices used in the train/validation/test splits, ensuring reproducibility. Exact details are provided in the code. For all datasets, we resize all images to 384×384 square resolution, and then split them into training, validation, and test sets with a ratio of 0.65:0.10:0.25, respectively. All experiments were implemented using PyTorch and conducted on 4 NVIDIA A100 GPUs.

We consider both the trend and the top-retrieved accuracy to be equally

important; therefore, δ is set to 1.0. Additionally, accounting for scenarios where all retrieved labels are identical (requiring high confidence) and cases with maximum label entropy (requiring low confidence), as well as the need to separate confidence scores across differently distributed samples, we require the sigmoid function to be relatively steep. Hence, we select $\sigma = 10.0$. Under these conditions, Figure A8 illustrates the relationship between lambda rate, confidence threshold, and top-1 retrieval accuracy. Consequently, we choose $\beta = 0.2$ and *confidence threshold* = 0.04.

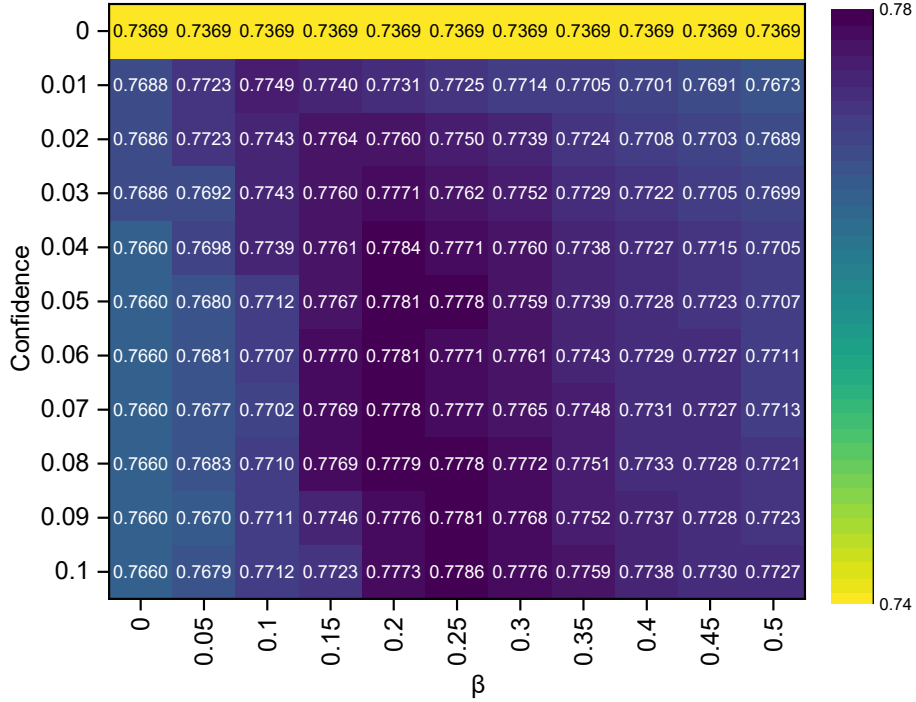


Figure A8: **Top-1 retrieval accuracy with different β and confidence.**