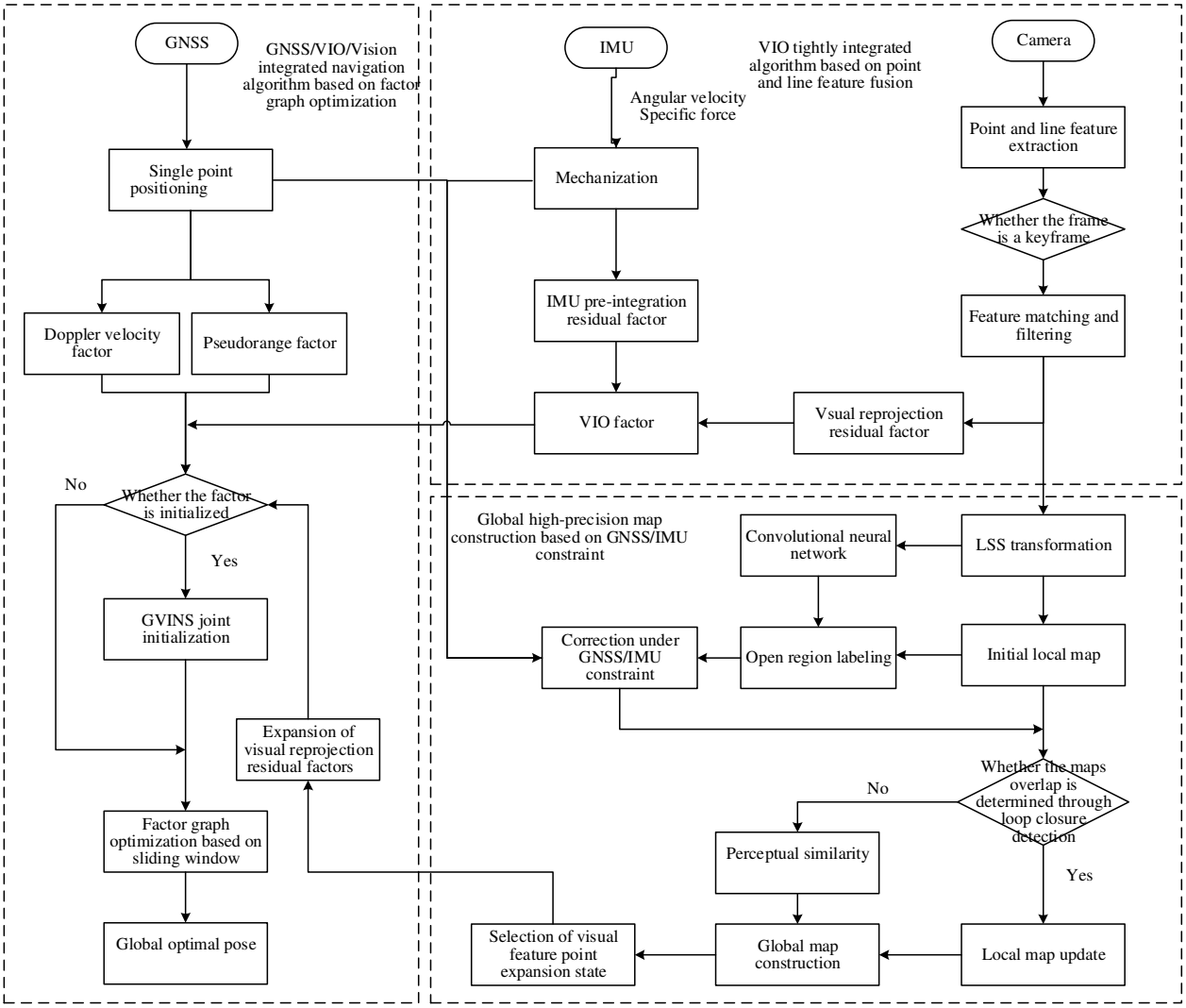
GNSS
GNSS/VIO/Vision integrated navigation algorithm based on factor graph optimization
IMU
VIO tightly integrated algorithm based on point and line feature fusion
Camera
Angular velocity
Specific force
Point and line feature extraction
Single point positioning
Mechanization
Whether the frame is a keyframe
IMU pre-integration residual factor
Feature matching and filtering
Doppler velocity factor
Pseudorange factor
VIO factor
Vsual reprojection residual factor
No
Whether the factor is initialized
Global high-precision map construction based on GNSS/IMU constraint
Convolutional neural network
LSS transformation
Yes
GVINS joint initialization
Correction under GNSS/IMU constraint
Open region labeling
Initial local map
Expansion of visual reprojection residual factors
Whether the maps overlap is determined through loop closure detection
No
Factor graph optimization based on sliding window
Perceptual similarity
Yes
Global optimal pose
Selection of visual feature point expansion state
Global map construction
Local map update

FIG. 1