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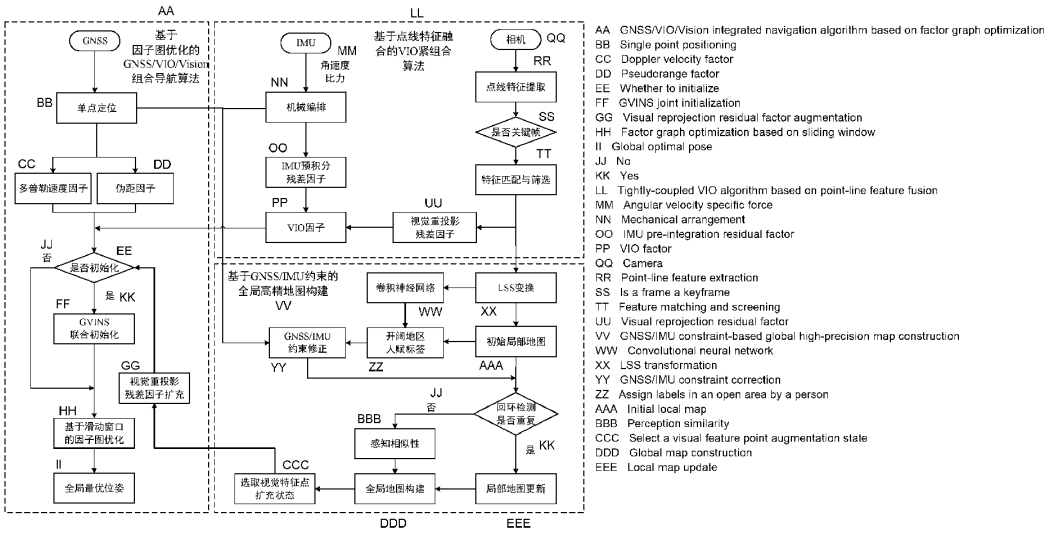
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(54) **Title:** BEIDOU-BASED MULTI-SOURCE FUSION POSITIONING METHOD IN DISASTER ENVIRONMENT

(54) 发明名称: 一种灾害环境下北斗多源融合定位方法



AA GNSS/VIO/Vision integrated navigation algorithm based on factor graph optimization
BB Single point positioning
CC Doppler velocity factor
DD Pseudorange factor
EE Whether to initialize
FF GVINS joint initialization
GG Visual reprojection residual factor augmentation
HH Factor graph optimization based on sliding window
II Global optimal pose
JJ No
KK Yes
LL Tightly-coupled VIO algorithm based on point-line feature fusion
MM Angular velocity specific force
NN Mechanical arrangement
OO IMU pre-integration residual factor
PP VIO factor
QQ Camera
RR Point-line feature extraction
SS Is a frame a keyframe
TT Feature matching and screening
UU Visual reprojection residual factor
VV GNSS/IMU constraint-based global high-precision map construction
WW Convolutional neural network
XX LSS transformation
YY GNSS/IMU constraint correction
ZZ Assign labels in an open area by a person
AAA Initial local map
BBB Perception similarity
CCC Select a visual feature point augmentation state
DDD Global map construction
EEE Local map update

图 1

(57) **Abstract:** The present invention provides a BeiDou-based multi-source fusion positioning method in a disaster environment, comprising the following steps: step 1, using a camera on a carrier to be positioned in the disaster environment to collect images, and constructing a VIO factor on the basis of point-line feature extraction; step 2, constructing a map, and performing, on the map to obtain a global map, refined correction under GNSS/IMU constraints; and step 3, augmenting a visual factor on the basis of the global map, and performing global pose optimization and solution by means of GNSS/INS/Vision integrated navigation, to complete BeiDou-based multi-source fusion positioning in the disaster environment. The method implements real-time and refined map construction in disas-

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PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UY, UZ, VC, VN, WS, ZA, ZM, ZW。

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ter scenes, prediction is carried out on the basis of the global map generated in real time, appropriate visual points are selected for augmentation, addition and deletion of a factor graph, so as to adapt to dynamic environment change under natural disasters, thereby improving the robustness and accuracy of a system that provides positioning for rescue vehicles.

(57) 摘要: 本发明提出了一种灾害环境下北斗多源融合定位方法，包括以下步骤：步骤1，使用所述灾害环境下待定位载体上的相机采集图像，并基于点线特征提取构建VIO因子；步骤2，地图构建并对其进行GNSS/IMU约束下的精细化修正，得到全局地图；步骤3，全局地图扩充视觉因子，并进行GNSS/INS/Vision组合导航全局位姿优化解算，完成灾害环境下北斗多源融合定位；该方法实现了灾害场景地图构建的实时性和精细化，通过实时生成的全局地图预测，选择合适的视觉点进行因子图的扩充和增删，以适应自然灾害下的动态环境变化，从而提高为救援车辆提供定位的系统的鲁棒性和精确性。