

开启医院物流机器人新时代

诺亚 医院物流机器人

Hospital Logistics Robot - MROBOT -

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MROBOT Company Profile

- ◆ Founded in Sep. 2014, in Shanghai
- ◆ Drafting Member of China Artificial Intelligence Standards
- ◆ Drafting Member of China Robot Standards
- ◆ Drafting Member of Hospital Intelligent Logistics Robot Standards
- ◆ 300 Core Patents, the First in this Field
- ◆ The First Company to complete CR(China Robot Certification) Factory Certification
- ◆ The First Hospital Intelligent Logistics Robot to complete CR Certification
- ◆ Advantages in Robot Indoor Navigation, Voice Interaction, Computer Vision, Multi-sensor Fusion, and Personalized Robot Design.

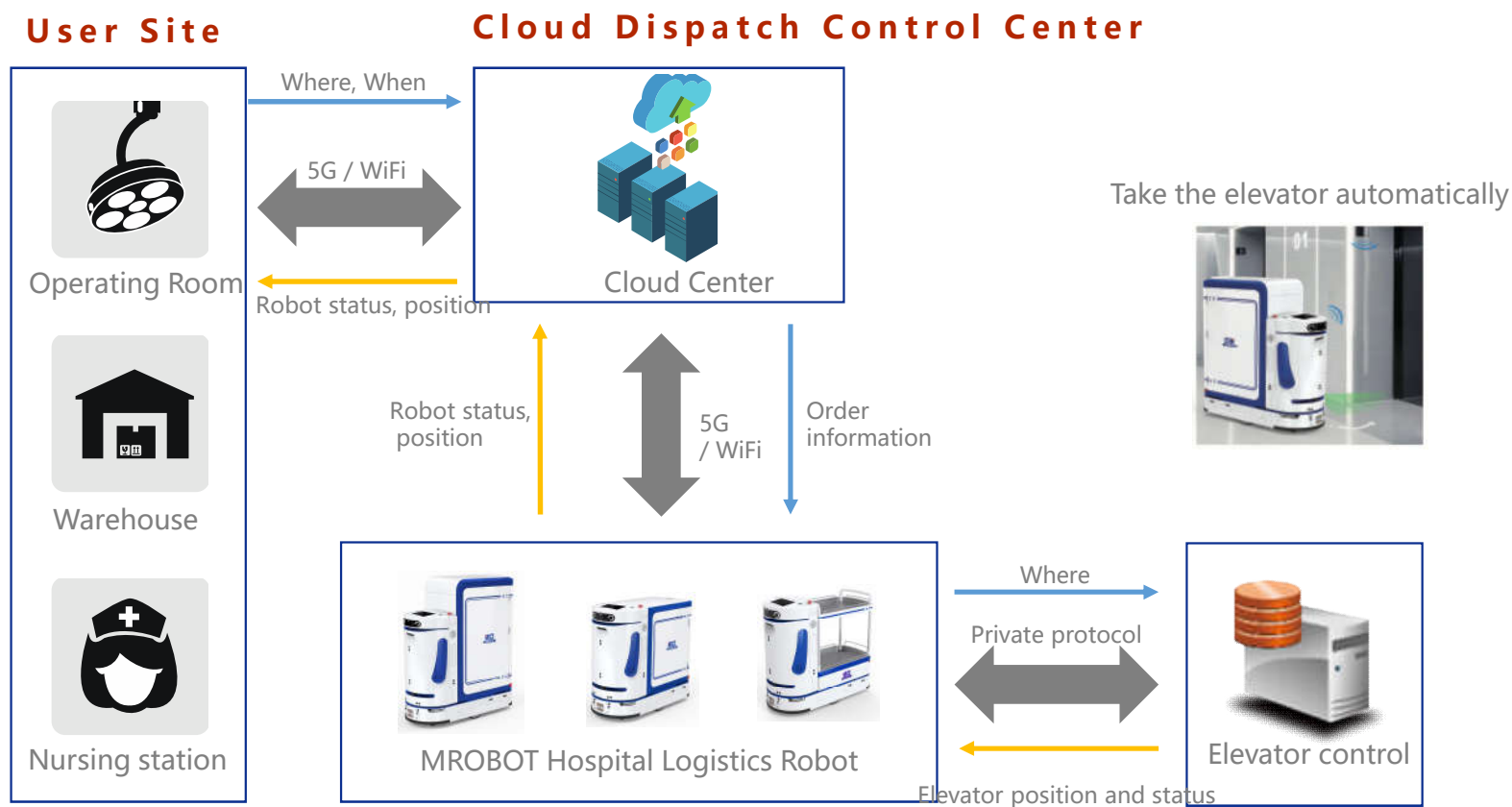
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Solution Overview

- ◆ Hospital Intelligent Logistics Robot for Operating Room、PIVAS、Laboratory etc.
- ◆ Closed-loop logistics tracking is formed from warehouse to end-use, which is the basis of closed-loop logistics management, intelligent logistics and intelligent hospital in the whole hospital.
- ◆ In-hospital logistics data are uploaded to the cloud server through the robot (data includes: operators, material information, delivery location, delivery time, time passing through each node, etc. (4W))
- ◆ Robot intelligent logistics liberates people from material transportation and data collection. Big DATA makes data processing more meaningful, and AI makes data analysis more efficient.
- ◆ Automated collection and preservation of logistics information for easy traceability
- ◆ Docking with hospital HRP and HIS system to provide accurate logistics data and improve efficiency and accuracy
- ◆ Through data analysis and optimization of division of labor, it will help to refine human management, improve efficiency and reduce indirect costs.
- ◆ Through data analysis and process optimization, the efficiency of warehouse operation can be improved.

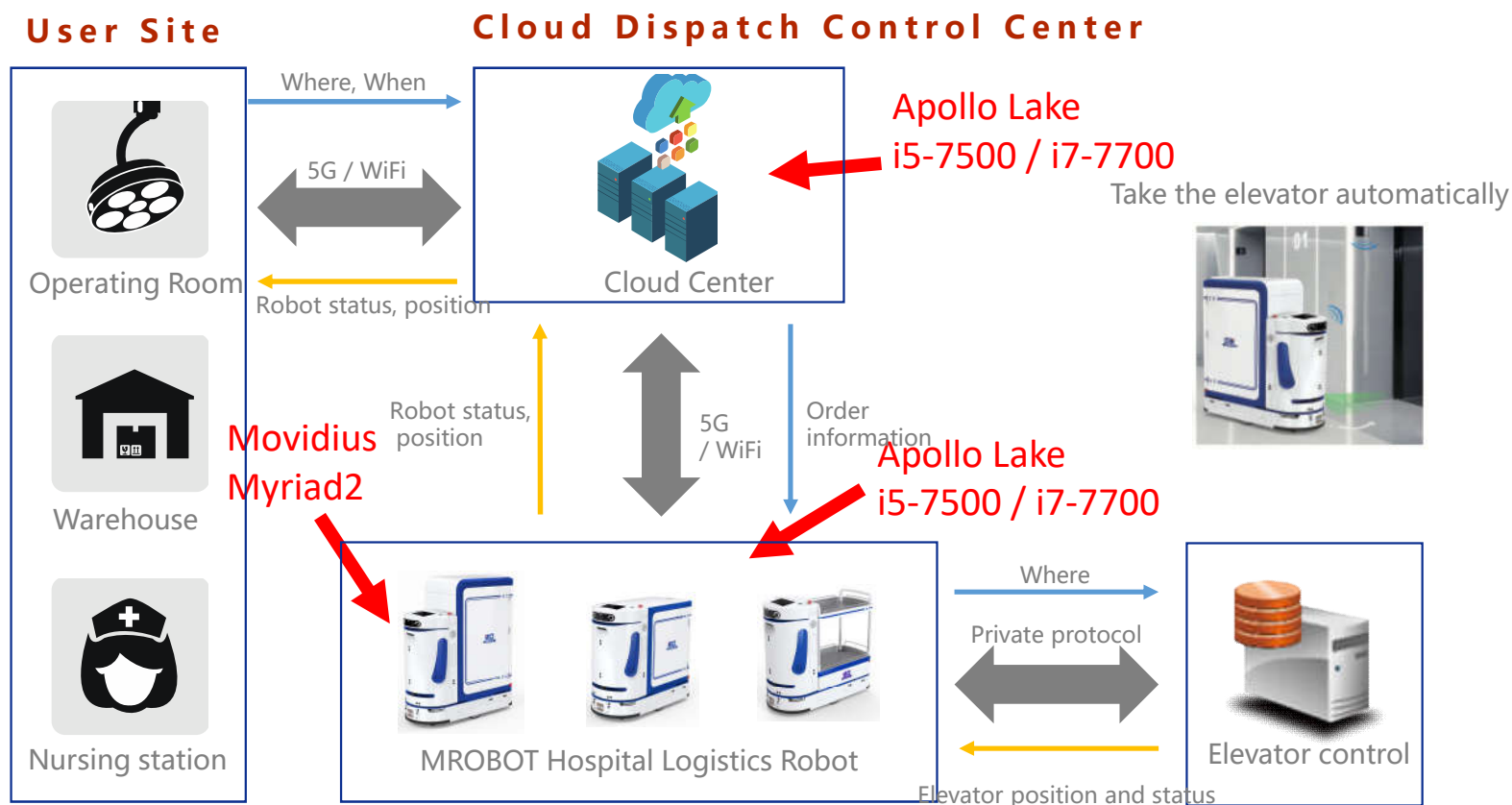
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Topological Graph



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Edge Hardware



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Navigation and Obstacle Avoidance (Apollo Lake+Myriad2)



Hospital Environmental Cognition
教会机器人认识医院环境内的物体

- ✓ 特殊障碍物多



Intelligent obstacle avoidance
对行人、物体不同的避障策略

- ✓ 医护人员/患者及家属多
- ✓ 紧急突发情况多



Navigation Based on Environmental Understanding
在人常出现、可能突然出现的地方会减速通过并语音播报

- ✓ 视线不好的路段



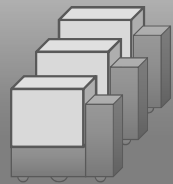
Multi-sensor Fusion
RGBD传感器、超声波、激光SLAM、信息融合

- ✓ 特征点少的长走廊

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Multi Robots Dispatching System (Apollo Lake)

High fault tolerance
避免单机故障对物流工作的影响



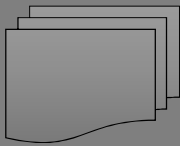
- ✓ 柔性扩展
- ✓ 机器人数量与服务器内存和运算能力成正比

Multi robot



- ✓ 在货柜和路线允许的条件下，不同货物之间可共享调度资源

Multi scene



- ✓ 同站点多种需求
- ✓ 多站点同一需求

Multi Task

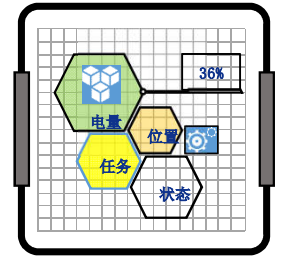


- ✓ 单机状态
- ✓ 多机情况
- ✓ 道路情况
- ✓ 站点情况
- ✓ 建筑空间容量
- ✓ 等等

Multi conditions

Single Robot monitoring

- battery level
- Position
- Task
- Status
- Etc.



Global monitoring



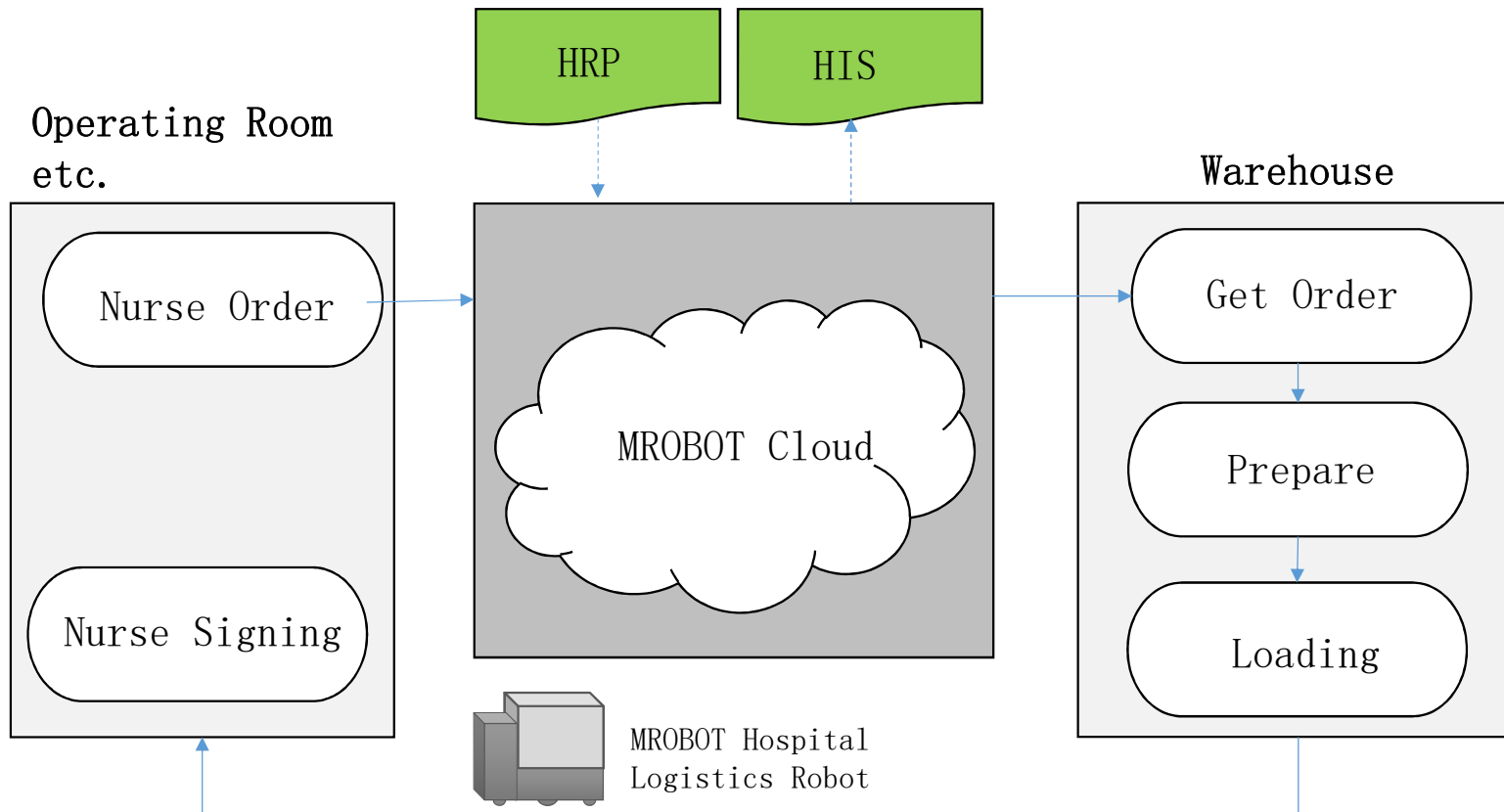
Road condition monitoring

- 恶意围堵
- 临时被封住的路

Site monitoring

- 有无机器人待命/装货

Docking with hospital HRP and HIS system



- ✓ Closed-loop logistics tracking
- ✓ Authentication
- ✓ Automatic charging

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Hospital Logistics Robot vs other Logistics Mode

	Pneumatic Logistics	Track Logistics	MROBOT Hospital Logistics Robot
Load	<5Kg	<30Kg	<300Kg
Speed	6-8m/s	0.6-1m/s	0.2-1.2m/s
Box Capacity	small	mid	big
Goods	Specimen, Drugs, Transfusion, Bedding and clothing	Specimen, Drugs, Transfusion, Bedding and clothing	All
Management	automation	automation	automation
Work time	24h x 7	24h x 7	24h x 7
Error rate	Low	Low	Low
transmission efficiency	Low, one piece every time	Mid	High
maintenance	Low Cost	High cost	Low Cost
Building renovation	Mid	Hard	Easy

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Implemented Projects



Guangzhou Women and Children Medical Center



Wuhan Tongji Hospital



Nanjing Yifu Hospital



Children's Hospital of Shanghai

- Taiwan General Military Hospital, Shenzhen Baoan Maternal and Child Hospital, Wuhan Asia Heart Disease Hospital, Shanghai Jiaotong University Medical Transfer Center, Nanjing Gulou Hospital, etc.
- Runs 41,850 hours with a total mileage of 14,690 kilometers (refreshing)
- Guangzhou Women's and Children's Medical Center project has won ten outstanding cases of the National Hospital Internet of Things Congress

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Implemented Projects

- MROBOT Hospital Logistics Robot was launched in Guangzhou Women's and Children's Medical Center in 2017
- In 2018, as the only hospital logistics robot, it was awarded 10 outstanding cases of Internet of Things application in Chinese hospitals.
- In 2019, awards Top10 as a case of logistic management value in China's hospital management

<https://www.cn-healthcare.com/article/20190401/content-516835.html?appfrom=jkj&from=groupmessage&isappinstall=0>



中国医院管理案例评选
CHINA HOSPITAL MANAGEMENT AWARDS 2019

后勤管理 价值案例 TOP10

案例编号	医院名称	案例名称
210066	首都医科大学附属北京地坛医院	基于BIM技术的医院后勤管理研究与创新应用
210054	上海申康医院发展中心	立体构建医院后勤保障专业队伍实践之路
210030	北京大学第三医院	应用危险源管理系统 提高医院安全管理效率
210017	上海市第一人民医院	医院创新供应链管理的探索与实践
210081	上海市第六人民医院	后勤一站式监控服务平台的建设与运营
210080	复旦大学附属中山医院 厦门医院	医院智能物流平台构建方案及实例研究
210084	台州恩泽医疗中心(集团) 恩泽医院	区域化消毒供应中心在综合性医院中的实践与管理
210018	复旦大学附属中山医院	医院后勤精细化管理新思路-建立保洁联盟与慧勤台实践
210037	广州市妇女儿童医疗中心	基于医院物流机器人构建医院智慧物流新业态
210053	三六三医院	“以“一站式服务”为抓手,提升后勤全要素生产率 信息化管理提高净化系统维护及时率
210085	清远市人民医院	

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Market Opportunities

	Hospital volume	Enclosed environment – Operating Room etc.		Semi-open environment		Sum
Present hospital		%	Robot Volume	%	Robot Volume	Robot Volume
Grade 3	2379	70%	8327	50%	17843	26169
Grade 2	8487	50%	21218	35%	44557	65774
sum	10866		29544		62399	91943
New hospital	1500	95%	11400	90%	43200	54600
sum	12366		40944		105599	146543

Notes:

1、At present, there are about 1 million people who participate in the internal transportation of hospitals in the country. The daily delivery volume of each hospital exceeds 20 tons, 2000 times per day. The workload is huge. There is a large upgrade space for hospital logistics.
 2、At present, it is the third peak of hospital construction, with an annual average of no less than 300 new hospitals/new hospital districts (such as only 50 in Jiangsu Province in 2017). It is estimated that 1500 new hospitals will be built in five years, and the average number of new hospital beds will be more than 1000.

- Probable projects for the next 12 months: 100 hospital projects with an average CPU usage of 20pcs each

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Thank you!



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