BabeMotion

A multifunctional Baby Companion Robot

D.Lite&Botential:

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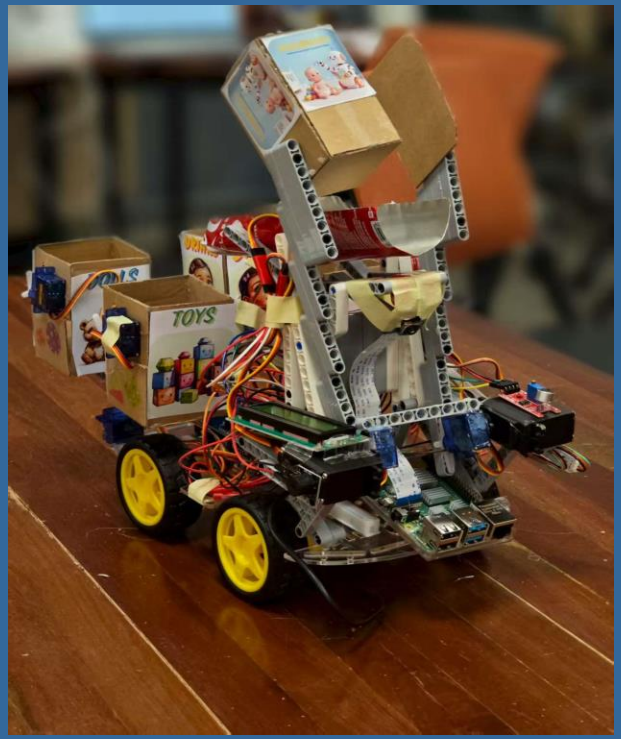
BabyMotio



- A **multifunctional intelligent baby companion vehicle**, featuring a safety warning system, an intelligent interaction module, autonomous grasping and classification, and data management.
- It aims to become a "**childcare expert**" available 24/7, providing comprehensive safety protection and various interaction for the baby.

Robot YuanHang by Wang

- Mechanical Design
- System Architecture
- Multi-Device Communication
- System Optimization
- Model Packaging

Baseline Model Development

Raspberry Pi Control Logic

Application Integration

Some Deep Learning Model Training

End-to-End Development

Led end-to-end robot-car development: mechanical design, baseline modeling, system architecture, and full control stack on Raspberry Pi; unified multi-device comms, DL-to-actuation pipeline, and network setup—demo walkthrough by me.

Robot ZheYi by Liu

1. Hardware Assembly & Design

Assemble the robot car; Design key modules like themobility system; Storage box, display, microphone, lights, androbotic arm ;

Handled all wiring connections.

2. Arduino Control Coding

Write low-level control code on Arduino; Manage the car'smovements and actions;

Ensuring smooth coordination between modules.

3. Exterior Design

Designed the robot's outer appearance to be clean, compact, anduser-friendly; Balance looks and functionality.

Deep Learning by Rui YuHan

- **Face recognition unlock :**
  - RetinaFace detects, Facenet extracts facial features, match to a known database;
  - After unlocking enter the system, ensure the security
- **Gesture Rocognition:**
  - Mediapipe to extract hand skeleton keypoints + unidirectional LSTM
  - Support over 7 gestures, can even customize any gesture yourself!
- **Object detection & Classification:**
  - Yolo, affine transformation to camera image, determine object location
  - Autonomously adjust vehicle location, cruise and grab objects, then classify
- **Baby pose classification:**
  - Yolo detects baby, HRNet extracts keypoints, classify with an advanced MLP
  - Judge baby pose, alert the caregiver when dangerous pose noticed

Deep Learning by Liu YiJia

- **Baby Cry Classification：**

  Integrate an advanced AST model, use ASTFeatureExtractor to perform deep feature extraction on a baby's cry audio, analyze the most probable reasons

- **Voice Assistant：**

  A full-stack integration of Speech-to-Text , a Large Language Model, and Text-to-Speech technologies; Support both voice and keyboard input .

- **Data Management & Persistence：**

  Utilize SQLite database to structurally store and manage the results of baby cry analysis; Provide data foundation for subsequent data analysis, trend observation, and historical review

- **System Integration & Application：**

  Integrate multiple independent modules(baby pose estimation & baby cry classification & data persistence etc.); Unified backend service and frontend interface; Achieve a complete end-to-end interactive logic.

THANK YOU!