PRIMARY STUDIES CLASSIFICATION

Table 1 - Robotic Platform

	Primary Studies
Not Specified	P2, P4, P5, P8, P10, P11, P12, P16, P17, P18, P23, P28, S02, S04, S06, S07, S08, S10, S13, S14, S15, S17, S19, S21, S22, S24, S27, S30, S31
Turtlebot	P7, P13, P24, P25, P29, P32, S01, S12, S16, S23
Kobuki	P6, P22, S01, S11
Care-o-bot	P20, S09, S28
KUKA robot	P26, P27
AgRob	S05, S16
PR2	P29, S28
Telerob Telemax UGV	P1
Twist T4 2x2 Electric Wheelchair	P3
FPGA	P9
Flightgoggles Quadrotor	P14
Parrot Anafi Quadrotor	P14
M4K	P15
EvoRally	P19
CAT (Ford Hybrid Escape)	P21
Landshark	S18
RaspberryPi	S20
FASTEN/Embraer Prototype	S25
M3-Neony	P30
NAO Humanoid	P31
Auto-ID Based Control Demo	S03

Table 2 - ROS Ecosystem Level

	Primary Studies
Filesystem	P1, P2, P3, P4, P5, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P25, P26, P27, P29, P32, S01, S02, S03, S05, S06, S07, S09, S11, S14, S17, S21, S22, S23, S24, S25, S27, S28, S29, S30, S31
Computation Graph	P1, P2, P3, P4, P6, P7, P8, P9, P11, P13, P14, P17, P18, P19, P20, P21, P22, P24, P25, P30, S05, S08, S09, S10, S11, S14, S15, S16, S18, S20, S26
Community	P4, P7, P8, P12, P13, P16, P23, P28, P31, S04, S12, S13, S19

Table 3 - Communication Paradigm

	Primary Studies
Topic	P1, P2, P3, P6, P7, P8, P9, P11, P13, P17, P18, P19, P20, P21, P22, P24, P25, P26, P30, S01, S05, S08, S09, S10, S11, S12, S14, S16, S18, S20, S22, S25, S26, S31
-	P4, P5, P10, P12, P14, P15, P16, P23, P27, P28, P29, P31, P32, S02, S03, S04, S06, S07, S13, S15, S17, S19, S21, S23, S24, S27, S28, S29, S30
Service	P3, P8, P11, P20, P22, P26, P30, S08, S09, S12, S16
Shared Memory	P3, S20

Table 4 - Quality Attribute

	Primary Studies
Functional Suitability	P2, P3, P6, P10, P11, P13, P14, P15, P18, P19, P20, P25, S01, S02, S03, S07, S08, S09, S10, S13, S15, S23, S26, S27, S29
Maintainability	P1, P3, P4, P5, P8, P9, P10, P11, P12, P16, P22, P23, P24, P25, P30, S04, S06, S09, S16, S21, S25
Portability	P1, P8, P12, P14, P16, P18, P19, P21, P23, P24, P25, P30, S03, S11, S13, S14
Compatibility	P1, P3, P8, P11, P14, P15, P16, P21, P23, P24, P25, P29, P30, S02, S14

Reliability	P1, P4, P6, P7, P8, P19, S07, S17, S18, S22, S26, S27, S29, S31
Usability	P1, P8, P12, P13, P16, P17, P24, P31, S06, S13, S17, S19, S21
Security	P4, P8, P25, P27, P28, S05, S17, S18, S24
Performance Efficiency	P26, P32, S12, S20, S28, S30, S31

Table 5 - Type of Robot

	Primary Studies
Mobile	P1, P3, P4, P6, P7, P13, P15, P18, P19, P20, P21, P22, P24, P25, P26, P29, P30, P31, P32, S01, S05, S09, S10, S11, S12, S16, S22, S23, S25, S26, S29, S31
-	P5, P9, P10, P11, P12, P16, P17, P28, S02, S04, S06, S13, S14, S15, S17, S18, S19, S21, S24, S27, S28
Fixed	P2, P27, S03, S08, S20
airborne	P14, P25, S07, S30

Table 6 - Cardinality

	Primary Studies
Single	P1, P2, P3, P4, P6, P7, P13, P14, P15, P19, P20, P21, P22, P24, P26, P27, P29, P30, P31, P32, S02, S03, S05, S07, S08, S09, S10, S11, S12, S14, S16, S22, S23, S25, S26, S28, S29, S30
-	P5, P8, P9, P10, P11, P12, P16, P17, P23, P28, S04, S06, S13, S17, S18, S19, S21, S24, S27
Multiple	P18, P25, S01, S02, S15, S20, S31

Table 7 - Application Field

	Primary Studies
-	P5, P10, P11, P12, P16, P17, P21, P28, S02, S04, S05, S13, S14, S15, S16, S17, S18, S19, S21, S24, S25, S27, S28
Navigation task	P6, P7, P13, P14, P15, P19, P24, P29, P32, S11, S12, S22, S23, S26, S28, S29, S31
Toy example	P2, P9, P22, P26, P27, P30, S01, S03, S06, S10
Multiple	P8, P23, P27, S08, S20
Unmanned	P25, S28, S30
Self-driving	P21, S25, S28
Home	P20, P31, S28
Medical	P3, S09
Search and rescue	P1
Military	P4
Leader/Follower	P18

Table 8 - ROS Version

	Primary Studies
ROS1	P26, P27, P28, P29, P30, P31, P32, S01, S02, S03, S04, S05, S06, S08, S09, S10, S11, S12, S13, S14, S15, S16, S17, S18, S19, S21, S22, S23, S24, S25, S26, S27, S28, S29, S30, S31
ROS2	P28, S04, S06, S07, S10, S12, S13, S20
Not Restricted	P1, P3, P6, P9, P10, P13, P14, P16, P17, P18, P19, P20, P21, P22, P24, P25

Table 9 - Knowledge Area

	Primary Studies
SW Design	P1, P7, P8, P9, P15, P21, P24, P26, P27, S01, S02, S03, S07, S08, S12, S13, S16, S17, S26, S27, S28, S31
SWE Models and Methods	P1, P2, P3, P6, P7, P11, P18, P19, P20, P24, P25, S02, S05, S09, S14, S16, S17, S21, S27, S31
SW Quality	P4, P20, P28, P32, S01, S05, S06, S12, S15, S18, S19, S20, S21, S22, S24, S25, S28, S29
SW Maintenance	P12, P16, P23, P28, P30, S08, S11, S14, S16, S25, S28
SW Testing	P5, P10, P14, P17, P18, P22, P23, S06, S10, S22, S29
SW Construction	P13, P23, P31, S03, S30
SW Configuration Management	P5, P7, P11, P24
SW Requirement	S07, S18, S19, S23
SWE Professional Practice	S03, S13

Computing Foundations	P14, P29

Table 10 - Research Strategy

	Primary Studies
Proposal of a Solution	P1, P2, P3, P4, P5, P6, P7, P9, P11, P14, P15, P17, P18, P19, P20, P21, P22, P24, P25, P26, P27, P29, S01, S02, S03, S05, S06, S07, S08, S09, S10, S11, S14, S15, S16, S18, S21, S22, S23, S26, S27, S29, S31
Evaluation Research	P5, P8, P12, P13, P16, P23, P28, P30, P31, P32, S03, S05, S12, S13, S15, S16, S19, S20, S24, S25, S28, S30
Validation Research	P1, P3, P6, P7, P14, P15, P18, P19, P21, P24, P25, P26, S12
Philosophical Paper	P10, S04, S17

Table 11 - Research Method

	Primary Studies
Lab Experiment	P13, P15, P25, P26, P27, P29, P32, S01, S02, S06, S09, S11, S12, S19, S20, S23, S24, S26, S27
Simulation-based Experiment	P1, P7, P14, P18, P19, P21, P24, P25, P31, P32, S03, S08, S10, S18, S22, S30, S31
Proof of Concept	P2, P4, P6, P9, P10, P11, P17, P20, P22, P30, S07
Real Deployment	P3, P14, P28, S05, S14, S15, S16, S25, S28, S29
Mining SW Repositories	P5, P8, P12, S04, S12, S13, S17, S21
Survey	P8, P16, P23
Interview	P16, P23

Table 12 - Future Challenges and Limitations

	Primary Studies
Multi-language/platform Support	P2, P11, P14, P15, P17, P20, P22, P27, P29, P31, S01, S08, S09, S10, S11, S13, S15, S16, S20, S24, S25, S29
Further validation	P1, P4, P10, P11, P13, P21, P24, P25, P26, P29, S03, S07, S11, S17, S20, S21, S26, S28, S30
Lack of generalization	P1, P7, P13, P16, P30, P32, S03, S06, S10, S12, S13, S14, S16, S17, S28
Support for Complex Specification	P2, P11, P22, P25, S01, S05, S09, S14, S22, S23, S26, S28, S29
Automation	P4, P6, P8, P10, P16, S03, S08, S09, S10, S15, S23
Performance Improvements	P9, P14, P15, P21, P22, S03, S15, S18, S20, S29
ıpport for More Reference Sources	P8, P20, P23, P28, S05, S15, S17, S21, S26
Evaluation of Quality Attributes	P3, P4, P10, S09, S18
Enable Self-adaptation	P18, S23
Run-time Support	P7, P17
Support for Real-time Properties	P25
Machine Learning Integration	P19