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1997 - 2017

Utilizing Open-Source Technologies and IoT, to Develop Practical Robots [Patent Status: *Filing*]

Applicability

Developing advanced robotics systems is expensive and complex due to the high costs of proprietary robot software, and its complex hardware and software designs.

By integrating software from a number of open-source technologies such as the **Robot Operating System (ROS)**, **android**, and others, we can create cheap, reliable, and advanced robot systems.

This opens up huge commercial opportunities in the areas of robot projects for social, medical, industrial, military, and agriculture applications, just to name a few.

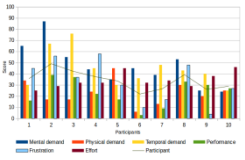
Usability/Availability

ROS provides a library of free and reliable software that cover every aspect of robot operations; navigation, sensor fusion etc. ROS is also **supported by all major robot manufacturers**, and can be implemented on all types of robots (mobile, humanoids, manipulators, custom-made, etc.). ROS also supports integration with other open-source platforms.

android is supported by more than **1.5 billion devices worldwide** (phones, tablets, wearables, etc.) and more than 2 million Apps available online. This makes this framework truly *Global*

Status of innovation

The Frame has been tested on a number of indoor and outdoor robot applications. The results showed great potential of quick robot response, comfortable user-experience and a moderate score of 43/100 on the NASA LTX



The ***Patrobot* project** is a direct result of this innovation; it is an autonomous robot designed to roam an agriculture field to prevent animal intrusion. This work attracted interest from a potential sponsor in the palm oil industry

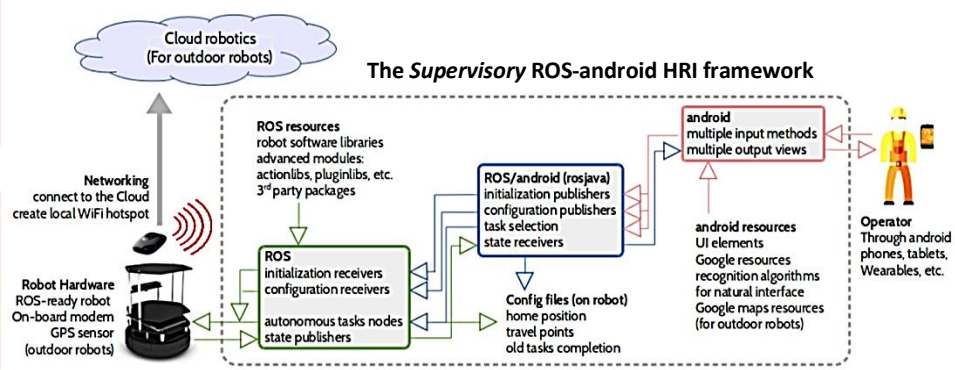
PATROBOT

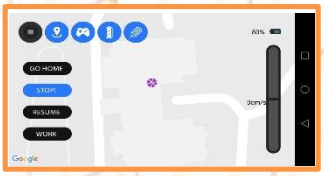
Commercialization

The ROS-android framework **offers a lucrative commercial opportunity** for possible investors. Although ROS and android offer libraries of free and reliable software, developers who use these libraries to create new systems for their new robot projects, they can choose to make their system proprietary. This opens the potential for achieving **very high Return on Investments** for these projects, and with the extensive support by ROS-android, the potential is even higher.

Path Configuration through android

Voice commands through android





Robot location on Google Maps view

LiveFeed from robot on android

Publications related to this innovation:

Paper 1 - Review of research in the area of cloud robotics conference, July 2014 (Scopus) **[Presented]**
Paper 2 - Review of Agriculture Robotics: Practicality and Feasibility, Dec 2016 (IEEE IRIS 2016 Conference, Scopus) **[Presented]**
Paper 3 - Bringing ROS to Agriculture Automation: Hardware Abstraction of Agriculture Machinery, Jan 2017 (IJAER, Scopus Journal) **[Accepted]**
Paper 4 - Establishing a Remote ROS Network via Port Forwarding: a Detailed Tutorial, 2017 (IJAER, Scopus Journal) **[Accepted]**
Paper 5 - Utilizing Open-Source Technologies to develop effective HRI frameworks for autonomous robots, 2017 (IJARS, ISI Journal) **[In Press]**
Paper 6 – Developing Practical and feasible agriculture robots, by combining ROS with android platforms, 2017 (ISI Journal paper) **[In Press]**