Technical Committee on Mobile Manipulation Newsletter (March 2012)

Editor's Note:
It is my pleasure to bring you the third newsletter of our technical
committee. The newsletter is a brief snapshot of the ongoing projects
and opportunities in our area. This particular newsletter features a
great set of new videos! If you would like your announcement to appear
in the next newsletter, simply send me an email
(berenson@eecs.berkeley.edu). Thanks to all the contributors!

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1. NEW ROBOT VIDEOS

--This video demonstrates the Next Best View component of our in-hand 3D
object modeling system
(http://www.cs.washington.edu/ai/Mobile_Robotics/projects/3d-in-hand/).
By simulating viewpoints of the hand and object, we can select the
next view to fill in these uncertain regions.
http://www.youtube.com/watch?v=ps3Pg9n1Vjw   (From Michael Krainin)

--TUM-Rosie and TUM-James collaboratively preparing sandwiches and popcorn:
http://youtu.be/DTaeWITW1kI (From Dejan Pangercic)

--TUM-Rosie and TUM-James cooking Bavarian breakfast, slicing bread
and shopping for groceries: http://youtu.be/gbIDPqb_2iM (From Dejan Pangercic)

--Interactive Segmentation: http://youtu.be/4VVov6E3iiM (From Dejan Pangercic)

--Recognizing and autonomously picking up a connector, using a Denso
arm, our Shadow Dexterous Hand and a Microsoft Kinect.
http://www.youtube.com/watch?v=gaL2718BxHc (From Ugo Cupcic)

--Removing contamination using a shadow hand by autonomously
dremmelling the contaminated part out of a wall
http://www.youtube.com/watch?v=pNx4nEteOhs (From Ugo Cupcic)

--Learning to control a low-cost robotic manipulator http://youtu.be/gdT6dwUOYC0
(From Marc Deisenroth)

--Path Planning for Image-based Control of Wheeled Mobile Manipulators
http://www.youtube.com/watch?v=m6HCwEctxj0 (From Moslem Kazemi)

--Kinodynamic Planning for Visual Servoing of a Wheeled Mobile Manipulator
http://www.youtube.com/watch?v=0U6KymeKn5U (From Moslem Kazemi)

--The service robot 'Kate' demonstrates mobile manipulation by taking
orders from persons and delivering coffee, coke and juice. All orders
are different and demonstrate mobile manipulation, learning from
demonstration for new manipulation tasks, active object recognition
and robust coordination of the tasks.
http://www.youtube.com/watch?v=nUM3BUCUnpY (From Dennis Stampfer)

--Manipulation planning with goal sets using constrained trajectory
optimization by exploiting the natural flexibility found in
manipulation: tasks are often described by an entire region of goals,
rather than a single goal configuration. Due to this added
flexibility, trajectory optimizers that take advantage of goal sets
converge to better solutions.
http://www.youtube.com/watch?v=noJQceF2VrI (From Anca Dragan)

--Factory 2020 from the SoftRobot project:
http://www.youtube.com/watch?v=_nD8c-fr8ik&fb (From Thilo Zimmermann)

--FlexIRob; Teaching Nullspace Constraints in Physical Human-Robot
Interaction: http://www.youtube.com/watch?v=3DqmvUl-6Bk&fb (From Thilo
Zimmermann)

--Students of Daniela Rus at MIT-CSAIL show the "MIT IkeaBot", a KUKA
youBot using a rotary claw to screw an IKEA table leg:
http://www.youtube.com/watch?v=nnsfJwYsTMk   (From Ross Knepper)

-- University of Twente shows how a KUKA youBot is placing bricks in
to a box using compliance control:
http://www.youtube.com/watch?v=8sl_FVd4M9M   (From Thilo Zimmermann)

--HERB, at the Personal Robotics Lab at Carnegie Mellon University,
plans to rearrange its environment using pushing actions to grasp

objects. http://www.youtube.com/watch?v=Im7TEZrRkFU (From Merhmet
Dogar)

--Improving Fluency of Human-Robot Handovers by addressing two key
problems observed in the fluency of human-robot hand-overs: (i) delays
in the transfer due to failure to convey handing intention, and (ii)
early, unsuccessful attempts to take the object due to the lack of an
intuitive timing signal. We demonstrate that these issues can be
addressed by (i) making hand-over poses as distinct as possible and
(ii) making the start of the trajectory that leads to the hand-over
pose the exact opposite. http://www.youtube.com/watch?v=VsuxPwhQS0I
(From Maya Cakmak)

2. NEW PROJECT WEBSITES

--A new robotics lab at Ben-Gurion University
(http://robotics.bgu.ac.il) has projects on manipulation and grasp
planning for GM:
http://robotics.bgu.ac.il/index.php/GM_project%3A_Common_grasp_search_algorithm
(From Amir Shapiro)

--A large integrated project with the intent of teaching mobile robots
how to perform household chores by learning from videos and natural
language instructions: robohow.eu. (From Dejan Pangercic)

3. NEW CODE RELEASES

--New code for interactive segmentation:
http://ros.org/wiki/pr2_interactive_segmentation (From Dejan
Pangercic)

--Completely revised version of the C++ robotics toolbox Simox:
Simox now includes models of the humanoid robots ARMAR-III and iCub.
simox.sourceforge.net (From Nikolaus Vahrenkamp)

4. ANNOUNCEMENTS

--The History of Mobile Manipulation
For those of you interested in the history of mobile manipulation we
have resurrected the web site of what probably was the first workshop
dedicated to the topic (March 2005). You can find it right
here:http://mobilemanipulation.org/amm/. (Click on "Read more..."

below to enable the hyperlinks.) It features presentations by Rob Ambrose (NASA), Rod Grupen (UMass Amherst), Vijay Kumar (UPenn), Greg Hager (Johns Hopkins), Ken Salisbury (Stanford), and Stefan Schaal (USC). There also is a final report that reflects what people thought back then the main problems and challenges would be. What do you think? How much progress have we made on these issues? Your comments are welcome! (From Oliver Brock)

--A Special Issue on "Visual Understanding and Applications with RGB-D Cameras" in the Journal of Visual Communication and Image Representation (JVCI) solicits papers on Perception for mobile manipulation in robotics:
http://ias/_media/people/pangercic/files/cfp-jvci12-vua-rgbd-camera.pdf
(From Dejan Pangercic)

--A new version of the Shadow Dexterous Hand:
Financed by the European project HANDLE, we want to perform in-hand manipulation with the Shadow hand. For this we needed very accurate control. We developed a new version which allows a computer to control the hand at a frequency of 1kHz using an etherCAT connection, making it possible to run very advanced controllers directly on the PC, instead of running them on the limited micro-controllers. With the added bandwidth, we also worked in partnership with Syntouch (http://www.syntouchllc.com/Home/Homepage.php) to integrate their amazing tactile sensors into our hand. (From Ugo Cupcic)

--RSS 2012 Workshop on Robots in Clutter: Manipulation, Perception and Navigation in Human Environments
Clutter severely affects all robot operations: manipulation, perception, navigation, and sensing. This makes it extremely difficult for a single approach to effectively handle clutter, perhaps explaining why robots (and robotics researchers) often shy away from it. This workshop aims to bring researchers from different domains together and promote a discussion about clutter. This will contribute to robotics research in at least two ways. First, it will be a venue for the exchange of strategies, ideas, and algorithms used by individual domains. Second, it will provide an opportunity to discuss system-level approaches where manipulation, perception, and navigation work together in the face of clutter.
http://www.willowgarage.com/clutter12 (From Mehmet Dogar)

--RSS 2012 Mobile Manipulation Workshop
The aim of this proposed workshop is to discuss the state of the art in mobile manipulation research. Robust, reliable mobile manipulation is critical for robotics applications in the home, health care and retail industries. The workshop will focus on research at the

intersection of motion generation and manipulation contact.
http://mobilemanipulation.org/rss2012/

--ICRA 2012 Mobile Manipulation Challenge: Yesterday's Sushi
We invite participation in the Yesterday's Sushi challenge to be held
at ICRA 2012 in Minneapolis this year. "Yesterday's Sushi" is a sushi
restaurant operated by autonomous robots. The robots are expected to
clean tables, set dishes and silverware on a clean table and serve
sushi. The intent of this challenge is to push the state of the art in
autonomous mobile manipulation, integrating perception, manipulation,
navigation and other capabilities. The environment is human-scale.
There are no constraints on the robot hardware allowed. The organizers
will provide two PR2 robots for participants wishing to use the PR2
robot. For more details and latest announcements, please see
mobilemanipulationchallenge.org. If you intend to participate in the
Challenge at ICRA 2012, please email the organizers before April 15,
2012. Sachin Chitta (sachinc AT willowgarage DOT com), Steve Cousins