

Culturally Sensitive Social Robotics for Africa

Check-In Meeting

15 December 2023



David Vernon
Carnegie Mellon University Africa

www.vernon.eu

Questions

1. What progress has been made so far by each partner?
2. What are the current challenges or obstacles you are facing?
3. What specific types of support or assistance are required to address these challenges and make further progress?
4. Any other business

Questions

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2. What are the current challenges or obstacles you are facing?
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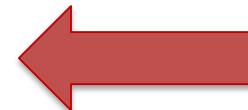
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The CSSR4Africa Consortium

Carnegie Mellon University Africa

**Carnegie Mellon
University Africa**
[David Vernon](#)



**University of the
Witwatersrand**
[Benjamin Rosman](#)
[Pravesh Ranchod](#)



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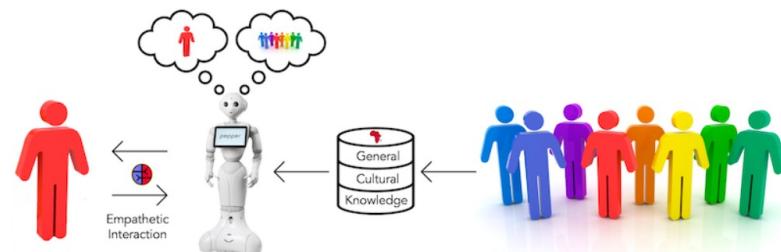
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cssr4africa.org

The CSSR4Africa Project

While technological invention creates new ways of doing things, it is *innovation* that produces social and economic benefits through widespread *adoption* and the consequent change in the people's practices. Adoption depends on physical infrastructure, but it also depends on social infrastructure: the conventions that govern people's behaviour, the practices they find acceptable and unacceptable, and their sense of what is trustworthy. Cultural competence, i.e., an awareness of social norms and cultural expectations, is a key element in fostering this acceptance.

The need for technology to be culturally competent is perhaps best exemplified by the field of social robotics, a field that is growing quickly.¹ Social robots serve people in a variety of ways: they operate in everyday environments, often in open spaces such as hospitals, exhibition centres, and airports, providing assistance to people, typically in the form of advice, guidance, or information.



Loosely based on ethnographic research to acquire cultural knowledge about acceptable modes of communication, the CSSR4Africa project will equip robots with the ability to interact sensitively and politely with people in Africa using spatial, non-verbal, and verbal modes of communication.

¹The global social robotics market was valued at \$1.98 billion in 2020 and is expected to reach \$11.24 billion by 2026 ([Global Social Robots Market 2022 – 2027](#)).

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Work Plan

The project work plan is available [here](#).

The statement of work (SoW) is available [here](#).

The effort estimates by task are available [here](#).

This project is funded by the [African Engineering and Technology Network \(Afretec\)](#) Inclusive Digital Transformation Research Grant Programme.

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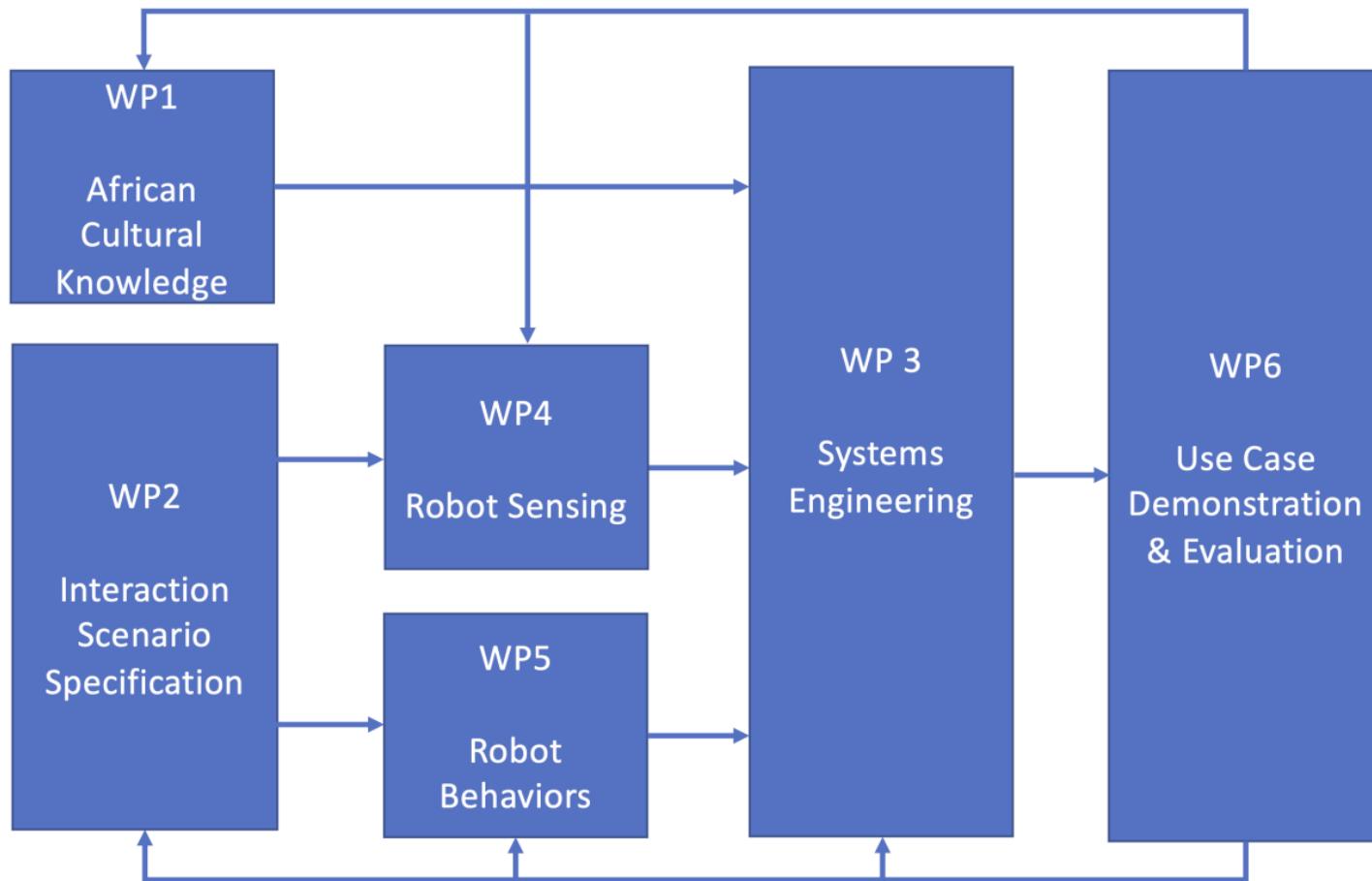
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Work Plan

Version 2.11
December 14, 2023

Start date of project: **01/07/2023**
Duration: **36 months**
Partner organisations: **Carnegie Mellon University Africa**
The University of the Witwatersrand

Project funded by the African Engineering and Technology Network (Afretec)
Inclusive Digital Transformation Research Grant Programme



2.4 Work Package Descriptions

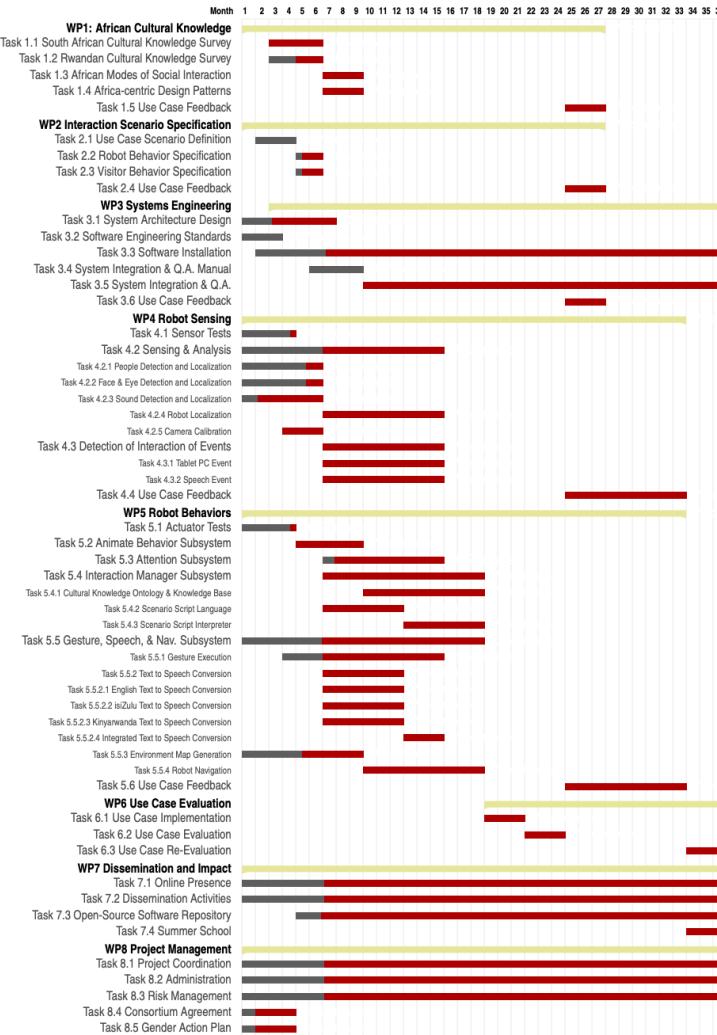


Figure 2: Gantt diagram showing the tasks in each work packages

WP1: African Cultural Knowledge

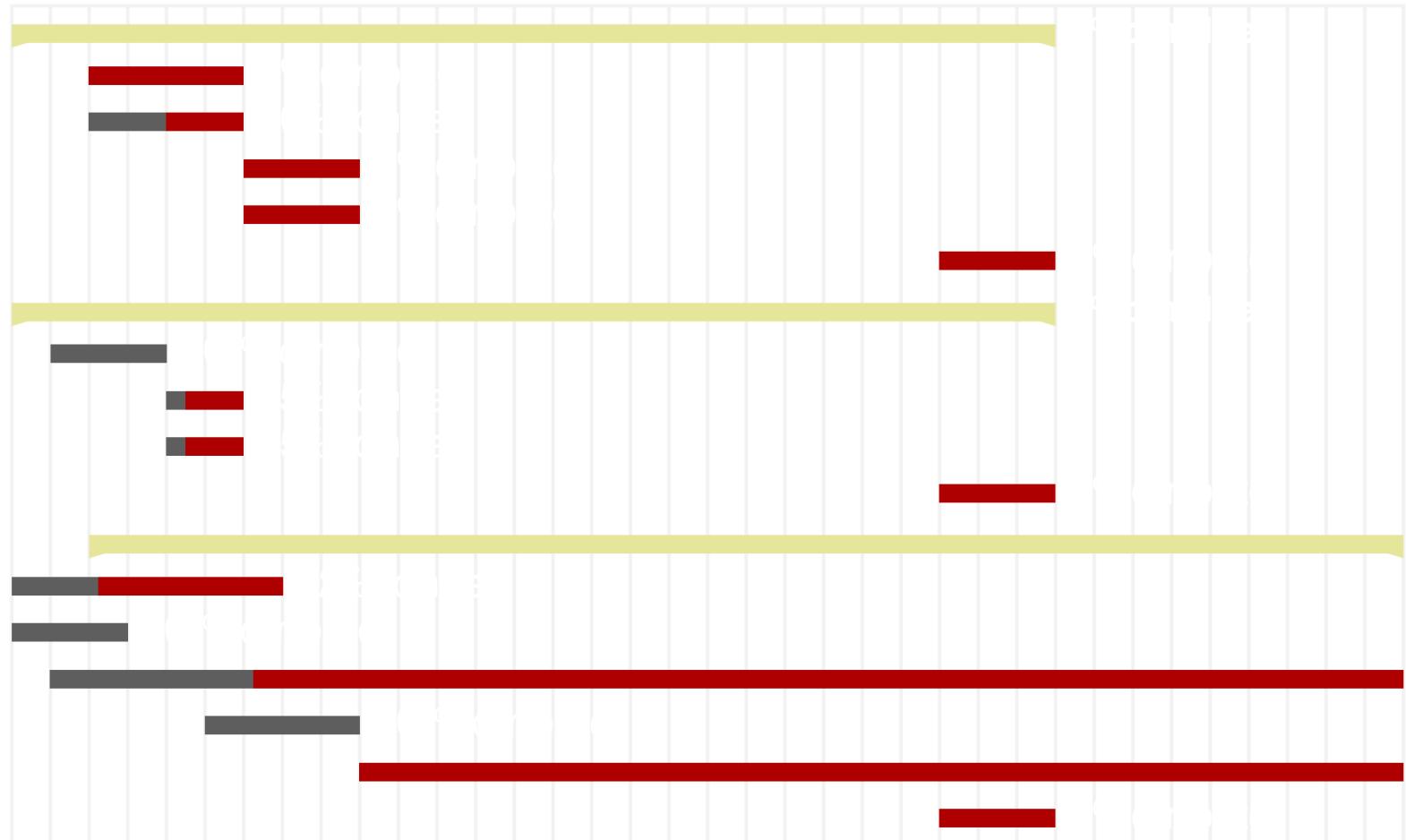
Task 1.1 South African Cultural Knowledge Survey

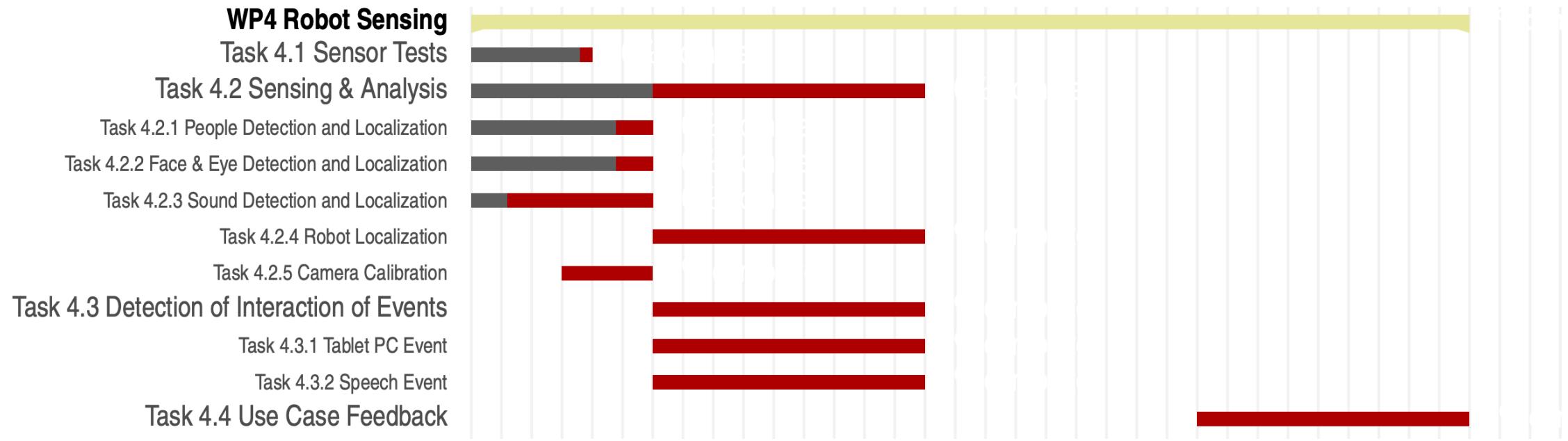
Task 1.2 Rwandan Cultural Knowledge Survey

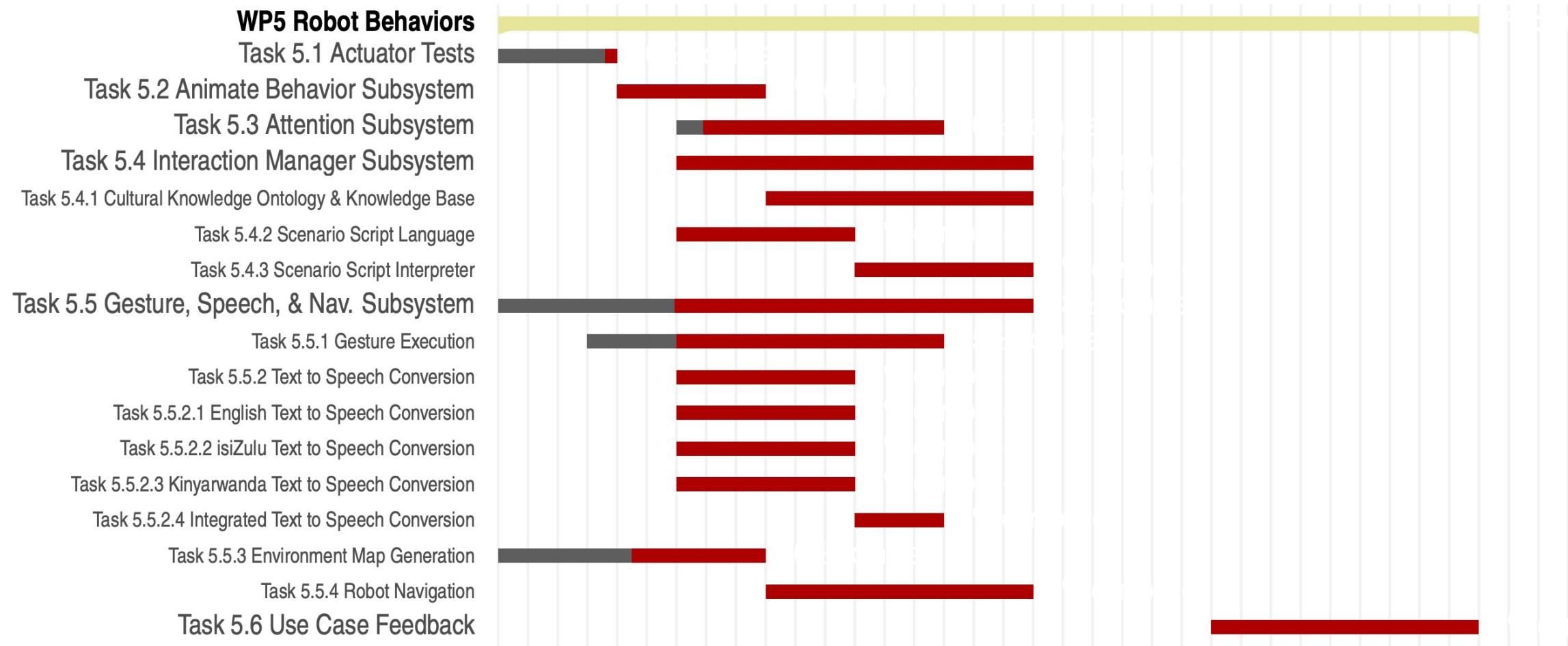
Task 1.3 African Modes of Social Interaction

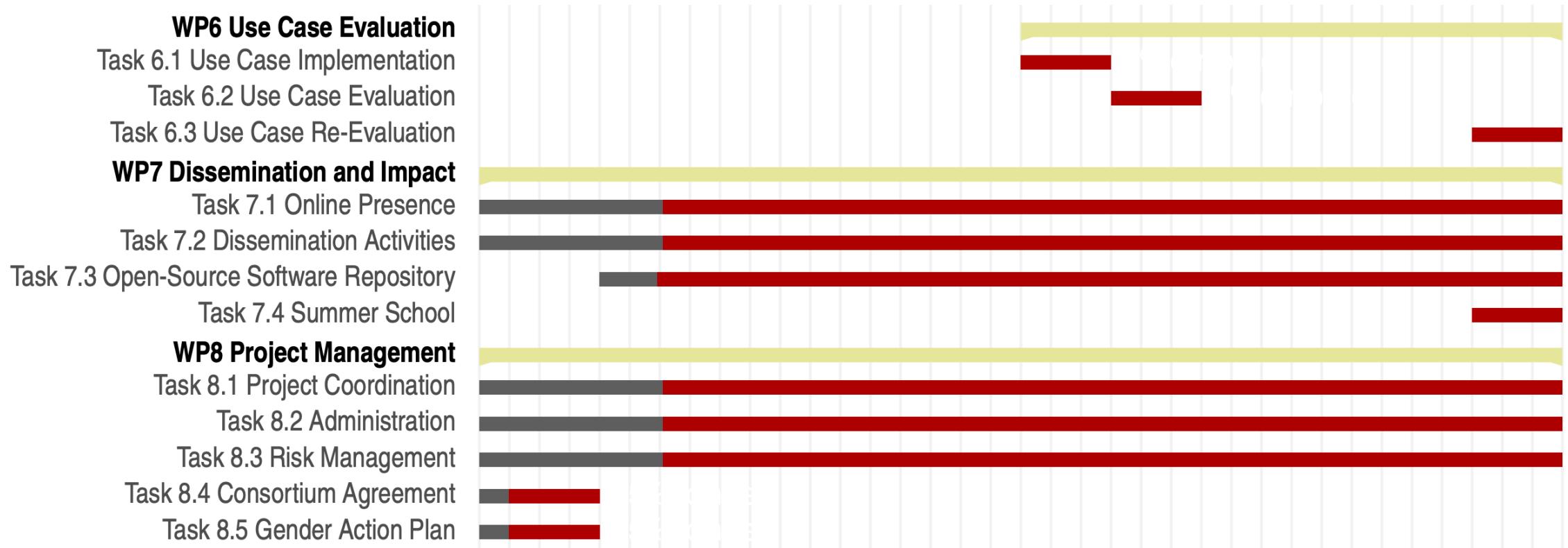
Task 1.4 Africa-centric Design Patterns

Task 1.5 Use Case Feedback











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D1.1	South African Cultural Knowledge, version 1	Wits	31/12/2023	
D1.1	South African Cultural Knowledge, version 2	Wits	31/09/2025	
D1.2	Rwandan Cultural Knowledge, version 1	CMU-Africa	31/12/2023	25/10/2023
D1.2	Rwandan Cultural Knowledge, version 2	CMU-Africa	30/09/2025	
D1.3	African Modes of Social Interaction, version 1	Wits	31/03/2024	
D1.3	African Modes of Social Interaction, version 2	Wits	30/09/2025	
D1.4	Africa-centric Design Patterns, version 1	Wits	31/03/2024	
D1.4	Africa-centric Design Patterns, version 2	Wits	30/09/2025	
D1.5	Updates to Deliverables D1.1, D1.2, and D1.3	Wits	30/09/2025	
D2.1	Use Case Scenario Definition, version 1	CMU-Africa	31/10/2023	07/11/2023
D2.1	Use Case Scenario Definition, version 2	CMU-Africa	30/09/2025	
D2.2	Robot Behavior Specification, version 1	CMU-Africa	31/12/2023	
D2.2	Robot Behavior Specification version 2	CMU-Africa	30/09/2025	
D2.3	Visitor Behavior Specification, version 1	CMU-Africa	31/12/2023	
D2.3	Visitor Behavior Specification, version 2	CMU-Africa	30/09/2025	
D2.4	Use Case Updates	Wits	30/09/2025	
D3.1	System Architecture Design, version 1	CMU-Africa	31/01/2024	
D3.1	System Architecture Design, version 2	CMU-Africa	31/12/2025	
D3.2	Software Engineering Standards Manual	CMU-Africa	30/09/2023	26/10/2023
D3.3	Software Installation Manual	CMU-Africa	31/12/2023	07/09/2023
D3.4	System Integration and Quality Assurance Manual	CMU-Africa	31/03/2024	01/11/2023
D3.5	System Integration and Quality Assurance	CMU-Africa	30/06/2024	
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This project is funded by the [African Engineering and Technology Network \(Afretec\)](#) Inclusive Digital Transformation Research Grant Programme.

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D1.2 Rwandan Cultural Knowledge

Due date: **31/12/2023**
Submission Date: **1/12/2023**

Start date of project: **01/07/2023**

Duration: **36 months**

Lead organisation for this deliverable: **Carnegie Mellon University Africa**

Responsible Person: **D. Vernon**

Revision: **1.4**

Project funded by the African Engineering and Technology Network (Afretec) Inclusive Digital Transformation Research Grant Programme		
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Workshop on Culturally Sensitive Social Robotics for All

Abu Dhabi 2023
iCAR

21st International Conference on Advanced Robotics

Abu Dhabi, UAE
5th December
2:00 pm - 6:00 pm

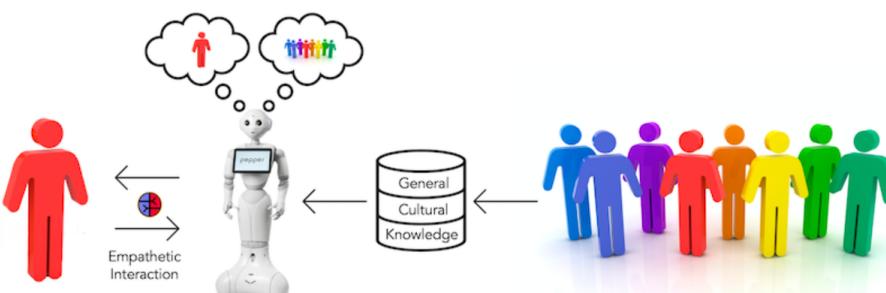
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Motivation

Robotics has potential to drive economic growth, accelerate development, deliver education, support healthcare, and increase food production, among many other things. However, technological invention in robotics is not enough because it is innovation, not just invention, that produces social and economic benefits through widespread **adoption** and the consequent change in the people's practices. Adoption depends on the conventions that govern people's behaviour, the practices they find acceptable and unacceptable, and their sense of what is trustworthy. **Cultural competence**, i.e., an awareness of social norms and cultural expectations, is a key element in fostering this acceptance. This is especially important in the fast-growing field of social robotics.¹

While there are studies on cultural differences in the acceptance of robots in the West and East, similar studies of the cultural factors that impact of acceptance in the Middle East and the Global South are few and far between. Of the fifty studies included in a survey by Lim et al. (2021),² only six focus on the MENA region and none target sub-Saharan Africa. Furthermore, only a very small fraction of the participants in these studies are from the MENA region and less than one percent are from sub-Saharan Africa.

The goal of this workshop is to gather cultural knowledge of interaction in the Middle East and North Africa (MENA) and sub-Saharan Africa so that we can equip social robots with the ability to interact sensitively and politely³ with people in those regions using spatial, non-verbal, and verbal modes of communication.⁴



Agenda

Time	Activity
2:00 pm - 2:10 pm	Welcome and introduction to the goals of the workshop
2:10 pm - 2:40 pm	Raquel Ros, PAL Robotics: <i>The challenges of social robotics and understanding user needs</i>
2:40 pm - 3:10 pm	Barbara Bruno, Karlsruhe Institute of Technology: <i>The nature of cultural competence in human-robot interaction</i>
3:10 pm - 3:30 pm	David Vernon, Carnegie Mellon University Africa: <i>The importance of cultural competence for diversity, equity, and inclusion</i>
3:30 pm - 4:00 pm	Coffee break
4:00 pm - 4:15 pm	The CSSR4All survey: walkthrough of the questionnaire
4:15 pm - 4:45 pm	Completing the CSSR4All online survey
4:45 pm - 5:15 pm	Review of the results of the survey
5:15 pm - 5:45 pm	Open discussion and consensus building
5:45 pm - 6:00 pm	Next steps
6:00 pm	Close and farewell

Cultural Knowledge Survey

dvernon@andrew.cmu.edu [Switch accounts](#)



Not shared

Workshop on Culturally Sensitive Social Robotics for All



21st International Conference on Advanced Robotics

Abu Dhabi, UAE
5th December
2:00 pm - 6:00 pm

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Workshop on Culturally Sensitive Social Robotics for All

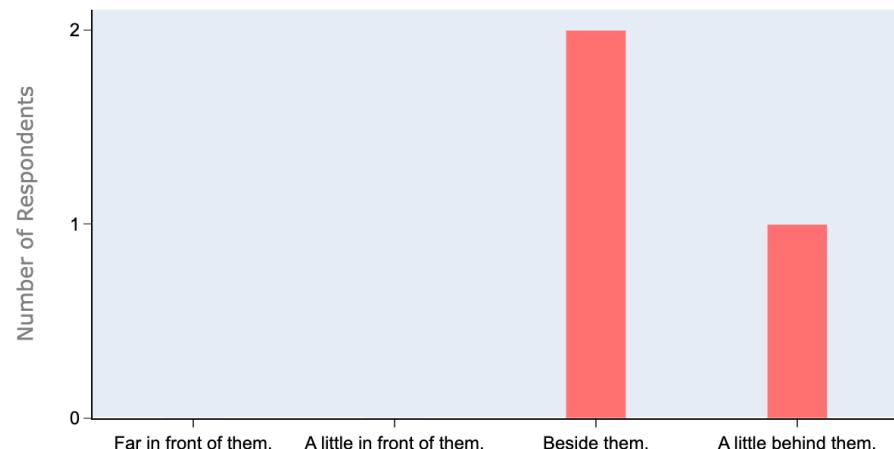
Abu Dhabi 2023
iCAR

21st International Conference on Advanced Robotics

Abu Dhabi



When showing someone younger than you the way, where should you position yourself?



Abu Dhabi 2023
iCAR

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D2.1 Use Case Scenario Definition

Due date: **31/10/2023**
Submission Date: **07/11/2023**

Start date of project: **01/07/2023**

Duration: **36 months**

Lead organisation for this deliverable: **Carnegie Mellon University Africa**

Responsible Person: **D. Vernon**

Revision: **1.1**

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D3.2 Software Engineering Standards Manual

Due date: 30/09/2023
 Submission Date: 28/11/2023

Start date of project: 01/07/2023

Duration: 36 months

Lead organisation for this deliverable: Carnegie Mellon University Africa

Responsible Person: D. Vernon

Revision: 1.4

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D3.3 Software Installation Manual

Due date: 1/10/2023
Submission Date: 07/09/2023

Start date of project: 01/07/2023

Duration: 36 months

Lead organisation for this deliverable: Carnegie Mellon University Africa

Responsible Person: CSSR4Africa Team

Revision: 1.3

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D3.4 System Integration and Quality Assurance Manual

Due date: **31/03/2024**
Submission Date: **01/11/2023**

Start date of project: **01/07/2023**

Duration: **36 months**

Lead organisation for this deliverable: **Carnegie Mellon University Africa**

Responsible Person: **D. Vernon**

Revision: **1.0**

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Software

Software developed by the CSSR4Africa consortium for the Pepper robot can be accessed by cloning the [CSSR4Africa repository on GitHub](#).

Instructions on how to install the software can be found in [Deliverable D3.3](#).

Since the project has just begun, the software comprises only a few rudimentary diagnostic routines at present.

This project is funded by the [African Engineering and Technology Network \(Afretec\)](#) Inclusive Digital Transformation Research Grant Programme.



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27 November 2023

Workshop update: There is a new format for the workshop on Culturally Sensitive Social Robotics for All ([CSSR4All](#)) at the 21st International Conference on Advanced Robotics, [ICAR 2023](#), Abu Dhabi, UAE, 5th December, 2 pm - 6 pm. We have two great invited speakers: [Barbara Bruno](#), Karlsruhe Institute of Technology, Germany, and [Raquel Ros](#), PAL Robotics, Spain.

20 November 2023

The second draft of Deliverable D1.2 Rwandan Cultural Knowledge is now available [here](#). Please refer to the document history for a list of the changes.

16 November 2023

A new version the CSSR4Africa work plan is available [here](#). This version, v. 2.8, updates Deliverable D4.1 Sensor Tests to remove the need for either a driver or a stub.

7 November 2023

The first draft of Deliverable D2.1 Use Case Scenario Definition (version 1.0) is now available [here](#).

1 November 2023

A new draft of Deliverable D3.2 Software Engineering Standards Manual (version 1.3) is now available [here](#). This version has some important changes to Appendices A and B which contain the mandatory standards (see Document History on p. 39).

Deliverable D3.4 System Integration and Quality Assurance Manual is now available [here](#).

27 October 2023

The [deliverables](#) page on the website now lists all deliverables due over the course of the project.

A new version the CSSR4Africa work plan is available [here](#). This version, v. 2.7, updates Deliverable D5.1 Actuator Tests to use an average angular

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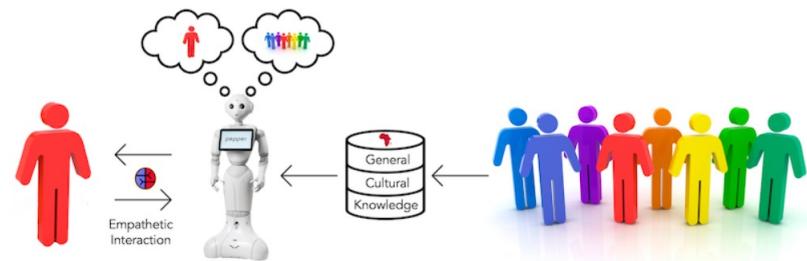
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Check-In Meeting

The CSSR4Africa Project

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Loosely based on ethnographic research to acquire cultural knowledge about acceptable modes of communication, the CSSR4Africa project will equip robots with the ability to interact sensitively and politely with people in Africa using spatial, non-verbal, and verbal modes of communication.

¹The global social robotics market was valued at \$1.98 billion in 2020 and is expected to reach \$11.24 billion by 2026 ([Global Social Robots Market 2022 – 2027](#)).

CSSR4Africa Wiki

cssr4africa edited this page on Oct 26 · 2 revisions

Welcome to the wiki for the Culturally Sensitive Social Robotics for Africa (CSSR4Africa) project, funded by the [African Engineering and Technology Network \(Afretec\)](#) Inclusive Digital Transformation Research Grant Programme.

The wiki is primarily a forum for exchanging information among the partners in the project consortium. The majority of the material available here is concerned with the effective operation of the project. Information of interest to others can be found on the [CSSR4Africa website](#).

Software developed by the CSSR4Africa consortium for the Pepper robot can be accessed by cloning the [CSSR4Africa repository on GitHub](#). Instructions on how to install the software can be found in [Deliverable D3.3](#). Since the project has just begun, the software comprises a suite of routines to verify the all of the actuators can be controlled using ROS and that all the sensor data can be accessed using ROS.

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<https://github.com/cssr4africa/>



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20 July 2023

The CSSR4Africa presentation at the Afretec Inclusive Digital Transformation Research Grants kick-off meeting is available [here](#).

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Resources

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Graphics

Here are the various graphics used in documents, the wiki, and the website.

[CSSR4Africa logo red](#)

[CSSR4Africa logo grey](#)

[CSSR4Africa logo black](#)

[Wits Centenary logo](#)

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Templates

cssr4africa edited this page on Aug 1 · 1 revision

Templates

The template for deliverables (both LaTeX and Word) is available [here](#).

The template for periodic progress reports (in Word) is available [here](#).

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Culturally Sensitive Social Robotics for
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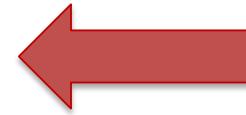
The CSSR4Africa Consortium

Carnegie Mellon University Africa

**Carnegie Mellon
University Africa**
[David Vernon](#)



**University of the
Witwatersrand**
[Benjamin Rosman](#)
[Pravesh Ranchod](#)



- Weekly meetings
- Quality assurance of website and deliverables
- Liaison with sociologist regarding ethnographic survey
- Ordering Pepper robot
- No other direct contribution yet due to
 1. Late start
 2. Unavailability of students to work on tasks

Questions

1. What progress has been made so far by each partner?
2. What are the current challenges or obstacles you are facing?
3. What specific types of support or assistance are required to address these challenges and make further progress?
4. Any other business

Current Challenges or Obstacles

- RA Productivity
 - Difficult for students to be productive as RAs during the semester
 - Some graduate RAs not productive (health issues)
- CMU-Africa overspending on RAs
 - About to begin using start-up funds
- Pepper died in June
 - Major disruption
 - New Pepper arrived end of October
- Delays with ROS control of Pepper
 - Controller conflicts

Questions

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Regular accounts (monthly or bi-monthly)

Afretec IDT CSSR4Africa Project Budget and Costs														
Cost Details			Costs to Date				Budget Total				Budget Remaining			
			Year 1	Year 2	Year 3	Total	Year 1	Year 2	Year 3	Total	Year 1	Year 2	Year 3	Total
Employee Salaries			16,778	0	0	16,778.00	11,185	11,521	11,867	34,573	(5,593)	11,521	11,867	17,795
2023-08														
Employee Fringe Benefits			1,594	0	0	1,594	1,063	1,094	1,127	3,284	(531)	1,094	1,127	1,691
Professional Fees				0	0	0	4,000	0	0	4,000	4,000	0	0	4,000
Travel Costs			6,375	0	0	6,375.06	13,930	13,930	13,930	41,790	7,555	13,930	13,930	35,415
2023-08	P. Zantou COMPASS Conf.	Flight	1,070											
	P. Zantou COMPASS Conf.	Accommodation	555											
	P. Zantou COMPASS Conf.	Registration	557											
2023-12	D. Vernon ICAR Workshop	Flight	927											
	D. Vernon ICAR Workshop	Accommodation Abu Dhabi	833											
	D. Vernon ICAR Workshop	Accommodation Dubai	346											
	R. Ros ICAR Workshop	Flight	1859											
	R. Ros ICAR Workshop	Accommodation Abu Dhabi	227											
Project Specific Expenses			39,506	0	0	39,506	37,642	23,448	24,115	85,206	(1,864)	22,850	22,850	45,699
2023-12	Deogratias Amani	RA Stipend (40%)	605											
	Kleber Kabanda	RA Stipend (40%)	605											
	Yohannes Haile	RA Stipend (40%)	605											
	Eyerusalem Birhan	RA Stipend (40%)	605											
	Mihiretab Taye Hordofa	Student RA Stipend	500											
	Natasha Mutangana	Student RA Stipend	500											
			3421											
Capital Assets over \$1,000/unit			25,470	0	0	25,470	25,050	0	0	25,050	(420)	0	0	(420)
2023-07	Pepper Robot		19,668											
2023-09	Import duties and taxes		5,368											
2023-09	Storage costs		365											
2023-09	Storage costs		69											
Total			129,229	0	0	89,723	92,870	49,993	51,039	193,903	3,147	49,395	49,774	104,180

Carnegie Mellon University Africa

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Culturally Sensitive Social Robotics for Africa

Check-In Meeting

15 December 2023



David Vernon
Carnegie Mellon University Africa

www.vernon.eu