

Train Robot to Climb Stairs: Maintain Stability of Robot

21_22-J 34

Status Document 1

Balasooriya T.D

IT18212150

Supervisor – Mr. Samantha Rajapakshe Co-Supervisor –
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B.Sc. (Hons) Degree in Information Technology Specializing in Information Technology

Department of Information Technology

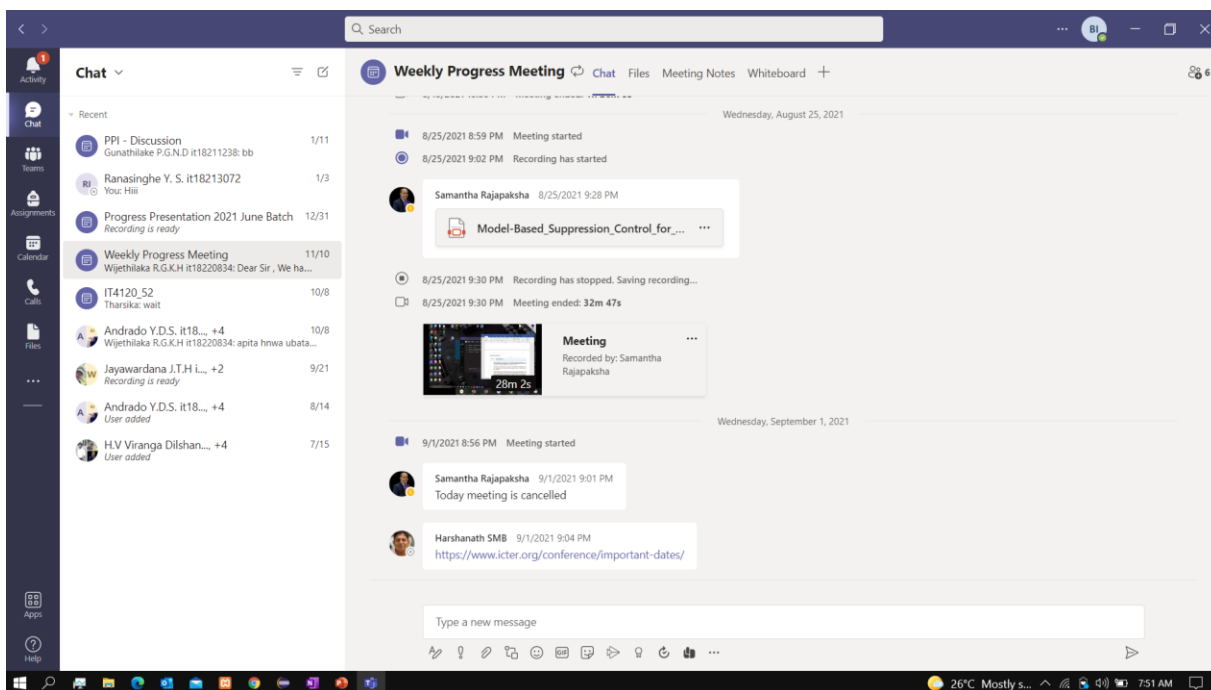
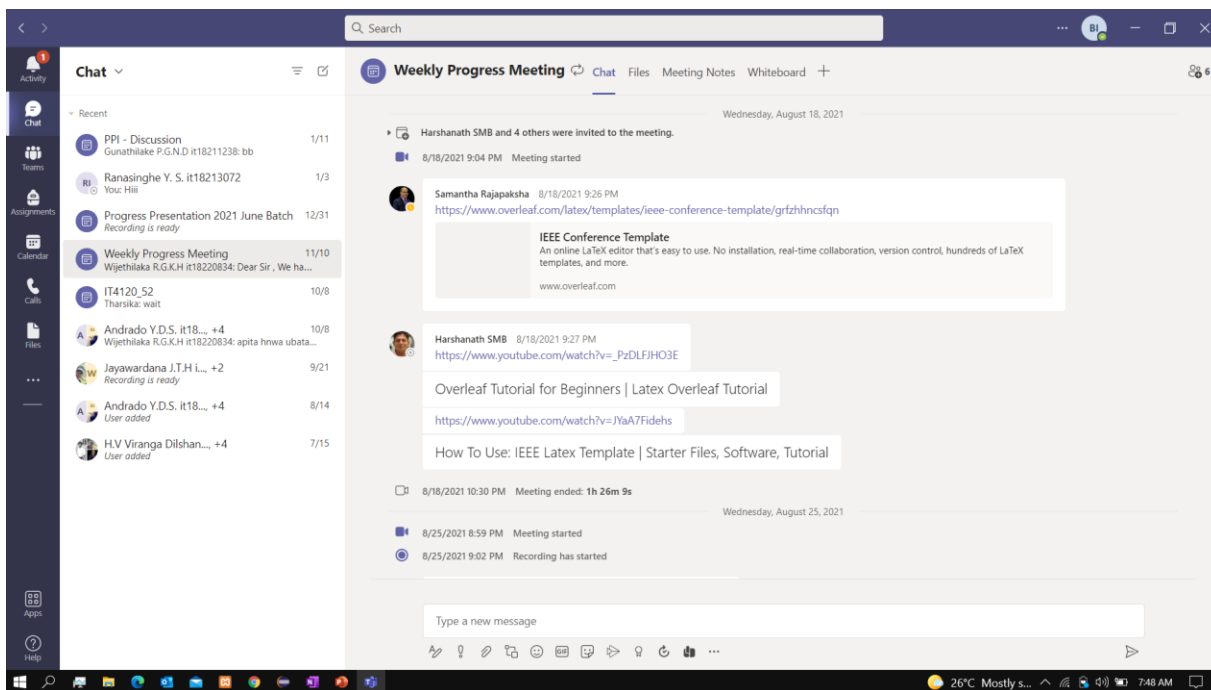
Sri Lanka Institute of Information Technology

Sri Lanka

January 2022

1) Screenshots of chats and calls with supervisors

1. MSTeams



Microsoft Teams interface showing a chat window titled "Weekly Progress Meeting". The chat history on the left lists recent messages, including "PPI - Discussion", "Ranasinghe Y. S. it18213072", "Progress Presentation 2021 June Batch", "Weekly Progress Meeting", "IT4120_52", "Andrado Y.D.S. it18... +4", "Jayawardana J.T.H L., +2", "Andrado Y.D.S. it18... +4", and "H.V Viranga Dilshan... +4".

The main chat area displays a message from Samantha Rajapaksha (9/8/2021 9:05 PM) with a link to <https://www.theconstructsim.com/> and a link to <https://www.udemy.com/>. Below this, a message from Harshanath SMB (9/8/2021 9:15 PM) includes a link to <https://pubmed.ncbi.nlm.nih.gov/23835772/> and a link to <https://pubmed.ncbi.nlm.nih.gov/9309638/>. The message content includes:

Online Courses - Learn Anything, On Your Schedule | Udemy
Udemy is an online learning and teaching marketplace with over 135,000 courses and 40 million students. Learn programming, marketing, data science and more.
www.udemy.com

Functional predictors of stair-climbing speed in older adults - PubMed
An older adult's stair-climbing speed can be accurately estimated by using a model that includes his or her usual gait speed and OLS. This information will help health care professionals and direc...
[pubmed.ncbi.nlm.nih.gov](https://pubmed.ncbi.nlm.nih.gov/23835772/)

Energy cost of stair climbing and descending on the college alumnus questionnaire - PubMed
In calculating the physical activity index (PAI) on the college alumnus questionnaire, it is assumed that 8 kcal are expended for every 20 steps climbed. This value is equal to an energy cost of 0...
[pubmed.ncbi.nlm.nih.gov](https://pubmed.ncbi.nlm.nih.gov/9309638/)

SAGE Journals: Your gateway to world-class research journals
Subscription and open access journals from SAGE Publishing, the world's leading independent academic publisher.
<https://journals.sagepub.com/doi/full/10.1177/1729881417720783>

The chat interface includes a search bar, a "Type a new message" input field, and a toolbar with icons for emojis, attachments, and other chat functions. The Windows taskbar at the bottom shows the time as 7:53 AM and the temperature as 26°C.

Microsoft Teams interface showing a chat window titled "Weekly Progress Meeting". The chat history on the left lists recent messages, including "PPI - Discussion", "Ranasinghe Y. S. it18213072", "Progress Presentation 2021 June Batch", "Weekly Progress Meeting", "IT4120_52", "Andrado Y.D.S. it18... +4", "Jayawardana J.T.H L., +2", "Andrado Y.D.S. it18... +4", and "H.V Viranga Dilshan... +4".

The main chat area displays a message from Harshanath SMB (9/8/2021 9:15 PM) with a link to https://www.researchgate.net/publication/257922577_Vision-based_Detection_of_Stair-cases and a link to https://www.researchgate.net/publication/321821638_Design_and_development_of_a_semi-autonomous_stair_climbing_robotic_platform_for_rough_terrains. Below this, a message from Harshanath SMB (9/8/2021 9:15 PM) includes a link to <https://www.hindawi.com/journals/mpe/2013/243094/> and a link to <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8402200>. The message content includes:

(PDF) Vision-based Detection of Stair-cases
PDF | On Jan 1, 2000, Stephen Se and others published Vision-based Detection of Stair-cases | Find, read and cite all the research you need on ResearchGate
www.researchgate.net

(PDF) Design and development of a semi-autonomous stair climbing robotic platform for rough te...
PDF | On Oct 1, 2017, Muhammad Umar Masood and others published Design and development of a semi-autonomous stair climbing robotic platform for rough terrains | Find, read and cite all the research...
www.researchgate.net

DSP- and FPGA-Based Stair-Climbing Robot Design
A stair-climbing robot is equipped with a grasping arm for capturing objects to provide service for the elders. A board based on a digital signal processor (DSP) plays the role of control center to...
www.hindawi.com

DEVELOPMENT OF CONTROL SOFTWARE FOR STAIR DETECTION IN A MOBILE ROBOT...
In this paper our main aim is to design and develop the control software for the detection and alignment of stairs by a stair climbing and manually operated ro...

The chat interface includes a search bar, a "Type a new message" input field, and a toolbar with icons for emojis, attachments, and other chat functions. The Windows taskbar at the bottom shows the time as 7:56 AM and the temperature as 26°C.

Microsoft Teams interface showing a chat window for "Weekly Progress Meeting". The chat history includes messages from Jayawardana J.T.H. and Harshanath SMB, dated September 15, 16, and 19, 2021. A file named "21_22-J 34.pptx" is shared in the chat.

Chat History:

- 9/8/2021 9:28 PM Meeting ended: 28m 4s
- 9/15/2021 8:58 PM Meeting started
- 9/15/2021 9:04 PM Jayawardana J.T.H. it18216974: Dear Sir don't we have meeting today.
- 9/15/2021 9:36 PM Meeting ended: 37m 39s
- 9/16/2021 8:50 PM Harshanath SMB: <https://www.icarc.lk/>
try to have a paper set
- 9/18/2021 9:00 PM Jayawardana J.T.H. it18216974: Dear Sir
Here is the our research proposal presentation which we expect to present.
21_22-J 34.pptx
- 9/19/2021 9:49 AM Harshanath SMB


Recent Chats:

- PPI - Discussion (Gunathilake P.G.N.D. it18211238: bb) 1/11
- Ranasinghe Y. S. it18213072 (You: Hi!) 1/3
- Progress Presentation 2021 June Batch (Recording is ready) 12/31
- Weekly Progress Meeting (Wijethilaka R.G.K.H. it18220834: Dear Sir , We ha...) 11/10
- IT4120_52 (Tharsika: wait) 10/8
- Andrado Y.D.S. it18... +4 (Wijethilaka R.G.K.H. it18220834: apita hnwa ubata...) 10/8
- Jayawardana J.T.H. i... +2 (Recording is ready) 9/21
- Andrado Y.D.S. it18... +4 (User added) 8/14
- H.V Viranga Dilshan... +4 (User added) 7/15

System tray: 26°C Mostly s... 7:58 AM

Microsoft Teams interface showing a chat window for "Weekly Progress Meeting". The chat history includes a video titled "Robot Learns to Climb Stairs Blind" shared by Harshanath SMB on September 19, 2021.

Chat History:

- 9/19/2021 9:49 AM Harshanath SMB: 
3:27 Now playing
Robot Learns to Climb Stairs Blind
<https://www.youtube.com/watch?v=MPhEmC6b6XU>
Robot Learns to Climb Stairs Blind - YouTube
We successfully used reinforcement learning to train a recurrent neural network to control our bipedal robot Cassie to climb stairs without any perception se...
www.youtube.com
- Cassie: Dynamic Planning on Stairs <https://www.youtube.com/watch?v=qV-92Bq96Co>
Cassie: Dynamic Planning on Stairs - YouTube
This video shows the progression of increasingly complex gait strategies from ATRIAS through recent results with Cassie. Specifically, Cassie's controller no...

Recent Chats:

- PPI - Discussion (Gunathilake P.G.N.D. it18211238: bb) 1/11
- Ranasinghe Y. S. it18213072 (You: Hi!) 1/3
- Progress Presentation 2021 June Batch (Recording is ready) 12/31
- Weekly Progress Meeting (Wijethilaka R.G.K.H. it18220834: Dear Sir , We ha...) 11/10
- IT4120_52 (Tharsika: wait) 10/8
- Andrado Y.D.S. it18... +4 (Wijethilaka R.G.K.H. it18220834: apita hnwa ubata...) 10/8
- Jayawardana J.T.H. i... +2 (Recording is ready) 9/21
- Andrado Y.D.S. it18... +4 (User added) 8/14
- H.V Viranga Dilshan... +4 (User added) 7/15

System tray: 26°C Mostly s... 7:59 AM

Windows taskbar showing icons for Start, Search, File Explorer, Edge, Office, Mail, Calendar, Chrome, Task View, PowerPoint, and Teams. System tray shows weather (26°C Mostly sunny), network, volume, and time (7:59 AM).

Search

Chat

Weekly Progress Meeting

Recent

- PPI - Discussion
Gunathilake P.G.N.D it18211238: bb 1/11
- Ranasinghe Y. S. it18213072
You: Hiii 1/3
- Progress Presentation 2021 June Batch
Recording is ready 12/31
- Weekly Progress Meeting
Wijethilaka R.G.K.H it18220834: Dear Sir , We ha... 11/10
- IT4120_52
Tharsika: wait 10/8
- Andrado Y.D.S. it18... +4
Wijethilaka R.G.K.H it18220834: apita hnwa ubata... 10/8
- Jayawardana J.T.H i... +2
Recording is ready 9/21
- Andrado Y.D.S. it18... +4
User added 8/14
- H.V Viranga Dilshan... +4
User added 7/15

The Art of Stair Climbing - Advanced instruction <https://www.youtube.com/watch?v=aV8MUQnltqc>

The Art of Stair Climbing - Advanced instruction - YouTube
#stairclimbing, #howtoclimbstairs, #walkingstairs, As part of the Life Athlete year round training system, fall is the best time of the year to hit the sta...
www.youtube.com

LeetCode 70. Climbing Stairs [Algorithm + Code Explained] Best Solution <https://www.youtube.com/watch?v=qhDXejbprJk>

LeetCode 70. Climbing Stairs [Algorithm + Code Explained] Best Solution - YouTube
One of the most frequently asked coding interview questions on Dynamic Programming in companies like Google, Facebook, Amazon, LinkedIn, Microsoft, Uber, App...
www.youtube.com

amazon Coding Interview
20:01 Now playing

Type a new message

26°C Mostly s... 8:01 AM

Search

Chat

Weekly Progress Meeting

Recent

- PPI - Discussion
Gunathilake P.G.N.D it18211238: bb 1/11
- Ranasinghe Y. S. it18213072
You: Hiii 1/3
- Progress Presentation 2021 June Batch
Recording is ready 12/31
- Weekly Progress Meeting
Wijethilaka R.G.K.H it18220834: Dear Sir , We ha... 11/10
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Tharsika: wait 10/8
- Andrado Y.D.S. it18... +4
Wijethilaka R.G.K.H it18220834: apita hnwa ubata... 10/8
- Jayawardana J.T.H i... +2
Recording is ready 9/21
- Andrado Y.D.S. it18... +4
User added 8/14
- H.V Viranga Dilshan... +4
User added 7/15

Amazon Coding Interview Question - Recursive Staircase Problem

Amazon Coding Interview Question - Recursive Staircase Problem - YouTube
Amazon coding interview question and answer - recursive staircase problem!For daily coding problems like this one, I'd recommend this website called Daily Co...
www.youtube.com

<https://www.youtube.com/watch?v=HFUhrI8-59c>

Jayawardana J.T.H it18216974 9/19/2021 10:24 AM

Harshanath SMB 9/19/2021 10:05 AM
20:01 Now playing Amazon Coding Interview Question - Recursive Staircase Problem

Thank you sir!

Harshanath SMB 9/19/2021 10:29 AM
check them all and some may go to Literature review / references and some for your knowledge and some for coding your project
will mark required change in the NOTE area of the presentation. Check and Do the changes before rehearsal. FIX A TIME for the rehearsal tomorrow (day time).

Harshanath SMB 9/19/2021 10:41 AM
Get Stairs Path - Solution | Recursion | Data Structures and Algorithms in JAVA <https://www.youtube.com/watch?v=hMJAibJIS7E>

Type a new message

26°C Mostly s... 8:01 AM

Microsoft Teams Chat interface for the "Weekly Progress Meeting".

Left Panel (Recent Chats):

- PPI - Discussion (Gunathilake P.G.N.D it18211238: bb) 1/11
- Ranasinghe Y. S. it18213072 (You: Hi!) 1/3
- Progress Presentation 2021 June Batch (Recording is ready) 12/31
- Weekly Progress Meeting (Wijethilaka R.G.K.H it18220834: Dear Sir , We ha...)** 11/10
- IT4120_52 (Tharsika: wait) 10/8
- Andrado Y.D.S. it18... +4 (Wijethilaka R.G.K.H it18220834: apita hwa ubata...) 10/8
- Jayawardana J.T.H i... +2 (Recording is ready) 9/21
- Andrado Y.D.S. it18... +4 (User added) 8/14
- H.V Viranga Dilshan... +4 (User added) 7/15

Right Panel (Chat History):

Jayawardana J.T.H it18216974 9/19/2021 11:25 AM

Harshanath SMB 9/19/2021 10:32 AM
will mark required change in the NOTE area of the presentation. Check and Do the changes before rehearsal. FIX A TIME for the...

Sure sir

Thank you

Harshanath SMB 9/19/2021 11:28 AM
when you are having the weekly meeting please let me know the daye and time to fix my time table

Jayawardana J.T.H it18216974 9/19/2021 11:31 AM

Harshanath SMB 9/19/2021 11:28 AM
when you are having the weekly meeting please let me know the daye and time to fix my time table

We have the weekly meeting on Wednesday at 9:00 pm sir.

Harshanath SMB 9/19/2021 11:32 AM

ok

did you discuss the presentation with Sir?

Mr Samantha?

Jayawardana J.T.H it18216974 9/19/2021 11:34 AM

Type a new message

26°C Mostly s... 8:03 AM

Microsoft Teams Chat interface for the "Weekly Progress Meeting" (continued).

Left Panel (Recent Chats):

- PPI - Discussion (Gunathilake P.G.N.D it18211238: bb) 1/11
- Ranasinghe Y. S. it18213072 (You: Hi!) 1/3
- Progress Presentation 2021 June Batch (Recording is ready) 12/31
- Weekly Progress Meeting (Wijethilaka R.G.K.H it18220834: Dear Sir , We ha...)** 11/10
- IT4120_52 (Tharsika: wait) 10/8
- Andrado Y.D.S. it18... +4 (Wijethilaka R.G.K.H it18220834: apita hwa ubata...) 10/8
- Jayawardana J.T.H i... +2 (Recording is ready) 9/21
- Andrado Y.D.S. it18... +4 (User added) 8/14
- H.V Viranga Dilshan... +4 (User added) 7/15

Right Panel (Chat History):

Jayawardana J.T.H it18216974 9/19/2021 11:34 AM

Harshanath SMB 9/19/2021 11:32 AM
did you discuss the presentation with Sir?

Not yet sir

Harshanath SMB 9/19/2021 12:01 PM

21_22-J 34 FEED BACK.pptx ...

Jayawardana J.T.H it18216974 9/19/2021 1:23 PM

Harshanath SMB 9/19/2021 12:01 PM
[File: 21_22-J 34 FEED BACK.pptx]

Thank you sir, we would do the necessary changes.

Jayawardana J.T.H it18216974 9/19/2021 10:50 PM

Dear Sir

Here is the updated version.

21_22-J 34.pptx ...

Samantha Rajapaksha 9/19/2021 10:51 PM

Type a new message

26°C Mostly s... 8:03 AM

Activity

Chat

Teams

Assignments

Calendar

Calls

Files

...

Apps

Help

Chat

Recent

PPI - Discussion

1/11

Ranasinghe Y. S. it18213072

1/3

Progress Presentation 2021 June Batch

12/31

Weekly Progress Meeting

11/10

IT4120_52

10/8

Andrado Y.D.S. it18... +4

10/8

Jayawardana J.T.H i... +2

9/21

Andrado Y.D.S. it18... +4

8/14

H.V Viranga Dilshan... +4

7/15

Weekly Progress Meeting

Chat

Files

Meeting Notes

Whiteboard

+

Here is the updated version.

21_22-J 34.pptx

Samantha Rajapaksha

9/19/2021 10:51 PM

email it

9/20/2021 3:00 PM

Meeting ended: 14m 55s

9/22/2021 9:09 PM

Meeting ended: 25s

9/29/2021 9:01 PM

Meeting started

Wijethilaka R.G.K.H it18220834

9/29/2021 9:12 PM

Dear Sir don't we have meeting today

Harshanath SMB

9/29/2021 9:19 PM

no

9/29/2021 9:19 PM

Meeting ended: 17m 30s

Wijethilaka R.G.K.H it18220834

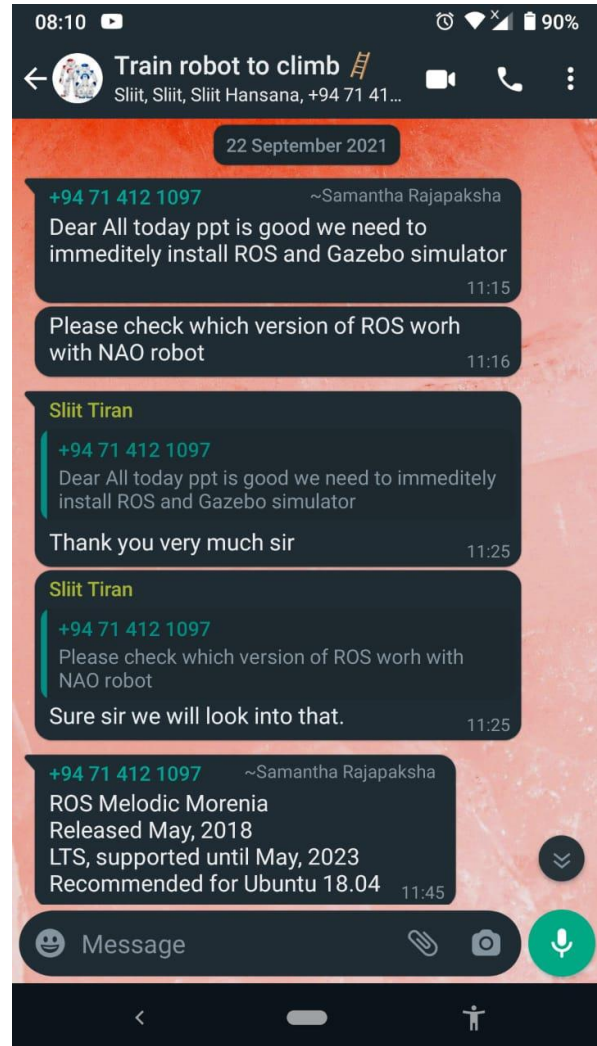
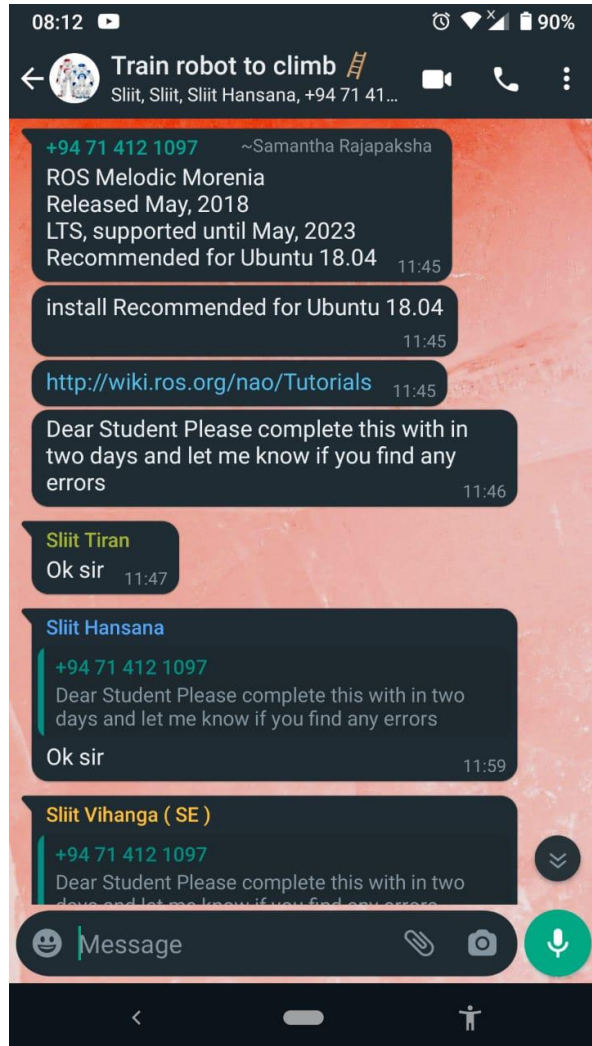
11/10/2021 8:32 PM

Dear Sir , We have progress meeting today?

Type a new message

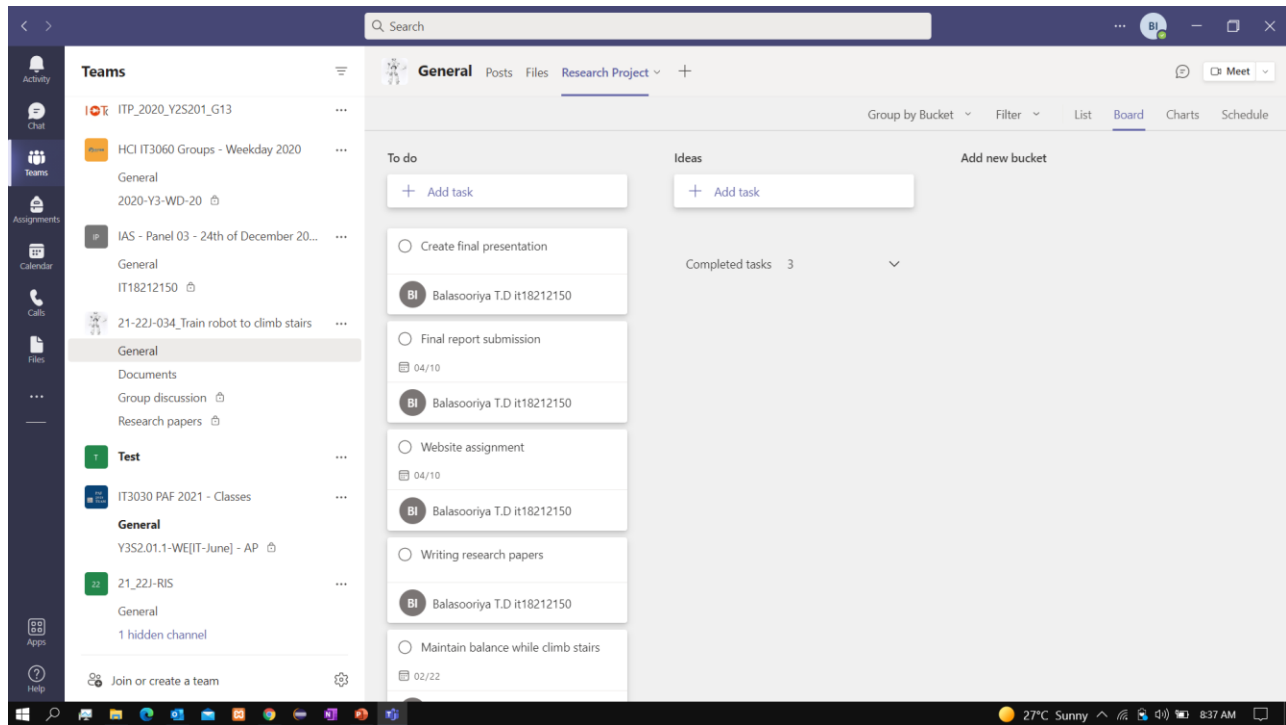
🖋️ 🗑️ 📎 😊 📧 📺 📶 🔊 🗑️ 📌 ...

1.2 WhatsApp



2 Project View/Gantt Chart

1. Work Breakdown Structure



Activity

Chat

Teams

Assignments

Calendar

Calls

Files

...

Apps

Help

Search

...

BI

Meet

Teams

ITP_2020_Y2S201_G13

HCI IT3060 Groups - Weekday 2020

General

2020-Y3-WD-20

IAS - Panel 03 - 24th of December 20...

General

IT18212150

21-22J-034_Train robot to climb stairs

General

Documents

Group discussion

Research papers

Test

IT3030 PAF 2021 - Classes

General

Y3S2.01.1-WE[IT-June] - AP

21_22J-RIS

General

1 hidden channel

Join or create a team

General

Posts

Files

Research Project

+

Group by Bucket

Filter

List

Board

Charts

Schedule

To do

+

Add task

Complete 50 percent progress presentation

Completed by Balasooriya T.D it1...

Implement Balance controller for NAO

Completed by Balasooriya T.D it1...

Refer research papers on stability for NAO-Robot

Completed by Balasooriya T.D it1...

configure choreography with Webots

Completed by Balasooriya T.D it1...

Research how to maintain stability of of a humanoid robot

Ideas

+

Add task

Completed tasks 3

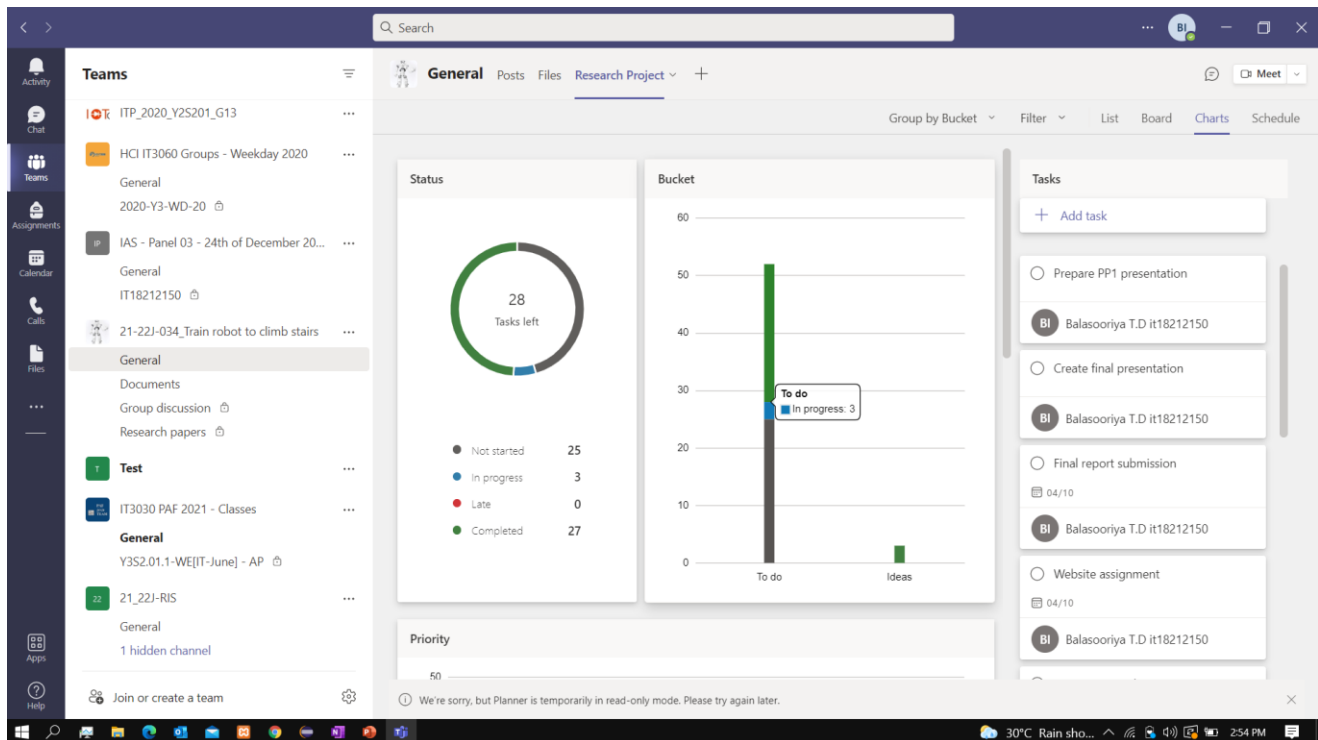
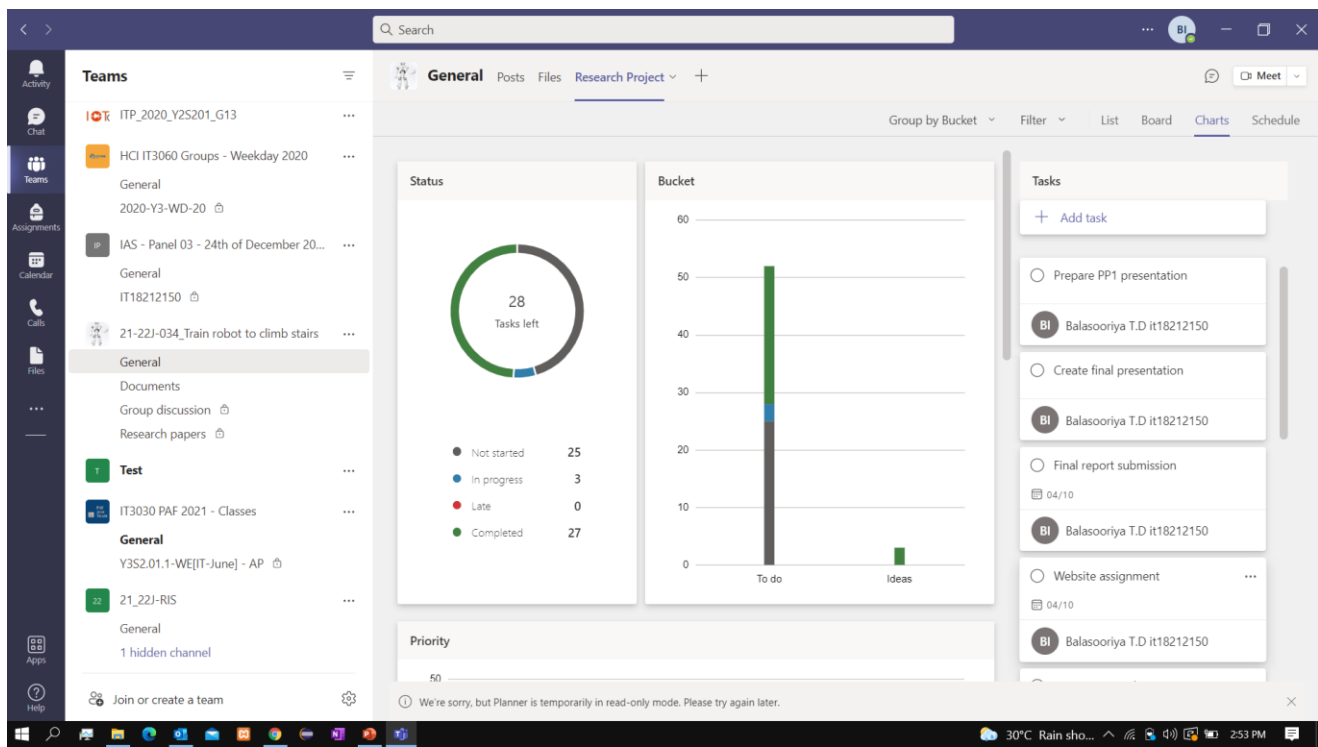
Add new bucket

We're sorry, but Planner is temporarily in read-only mode. Please try again later.

30°C Rain sho...

2:51 PM

2.2 MS Teams Generate Report



2.3 Supervisor's general Progress presentation

The screenshot shows an Outlook window with a search for 'Progress Meeting June Batch -Research Project'. The search results are displayed in a table format, showing the status of various presentations.

From	Status
it18211474@my.sliit.lk	Presented.
it18221206@my.sliit.lk	Presented.
it18205534@my.sliit.lk	Presented.
it18221442@my.sliit.lk	Absent
it18216974@my.sliit.lk	Presented.
it18217100@my.sliit.lk	Presented.
it18220834@my.sliit.lk	Presented.
it18212150@my.sliit.lk	Presented.
it18227314@mysliit.lk	Presented.
it18218640@my.sliit.lk	Presented.
it18256888@my.sliit.lk	Presented.
it18257632@my.sliit.lk	Absent

The screenshot shows an Outlook window with a search for 'Progress Presentation'. The search results are displayed in a table format, showing the status of various presentations.

From	Status
it18211474@my.sliit.lk	Presented.
it18221206@my.sliit.lk	Presented.
it18205534@my.sliit.lk	Presented.
it18221442@my.sliit.lk	Absent
it18216974@my.sliit.lk	Presented.
it18217100@my.sliit.lk	Presented.
it18220834@my.sliit.lk	Presented.
it18212150@my.sliit.lk	Presented.
it18227314@mysliit.lk	Presented.
it18218640@my.sliit.lk	Presented.
it18256888@my.sliit.lk	Presented.
it18257632@my.sliit.lk	Absent

Progress Presentation

Samantha Rajapaksha <samantha.r@sliit.lk>

To: Wickramasinghe K. E. T. (it18202632); Nirogini A. (it18412994); Panduwawala P.K.K.G. (it18194518); Wijethunga L.P.P.L. (it18080254); Premakumara R.H.M. (it18203240); Niluka K.A.T. (it18214758); SANDAMALI G. W. (it18228236); +21 others

Cc: Jagath Wickramaratne

1 If there are problems with how this message is displayed, click here to view it in a web browser.

[EXTERNAL EMAIL] This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.

Dear Students

Please present your progress next Thursday at 10.30 pm with two slides.

U.U.Samantha Rajapaksha
M.Sc.(SLIIT), B.Sc.(Engineering)
Senior Lecturer/Coordinator M.Sc.in IT
Sri Lanka Institute of Information Technology
Tel:01175448021 Mob:0714121097
Email: samantha.r@sliit.lk
www.sliit.lk

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2.3 Gantt Chart

